



**ONE DIRECTION**  
**WHY THE SINGLE**  
**EUROPEAN SKY IS**  
**ONLY WAY AHEAD**  
**ATM SPECIAL P26**

#### **RATE DEBATE**

Can the big two produce 60 narrowbodies each per month? Ascend looks at the risks involved **14**

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Why nuclear submarine programme is first threat to US Air Force's strike bomber renewal **19**

# FLIGHT

## INTERNATIONAL

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7-13 JULY 2015

### **TANKERS**

## **BOOMING BUSINESS**

Australia to top up its MRTT fleet, as South Korea also picks Airbus type



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**COVER IMAGE**

It was a bumper week for Airbus Defence & Space, with Australia to boost its A330 MRTT fleet to seven and South Korea to acquire four of the tankers **P7**



**BEHIND THE HEADLINES**

David Learmount assesses the conditions which make Vágar in the Faroe Islands one of Europe's toughest operating locations. In his report (P30), he looks at how Atlantic Airways is now using satellite-guided approaches to beat the weather forecast



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## IMAGE OF THE WEEK

The world's last flying Avro Vulcan – XH558 – took part in a “V-Force Tour” of the UK, and is seen here flying over the Imperial War Museum in Duxford on 28 June. The tour was the bomber's farewell to the 17 locations where V-Force aircraft – Valiant, Victor and Vulcan – are now located

View more great aviation shots online and in our weekly tablet edition:



Imperial War Museum

## THE WEEK IN NUMBERS

13%

Flightglobal dashboard

Lufthansa is to sell off its stake in Luxembourg flag carrier, Luxair; the Grand Duchy will remain in charge, with 39%

\$400m

Flightglobal dashboard

If successful, a planned flotation of 10% of its shares would value Indian low-cost carrier IndiGo at \$4 billion

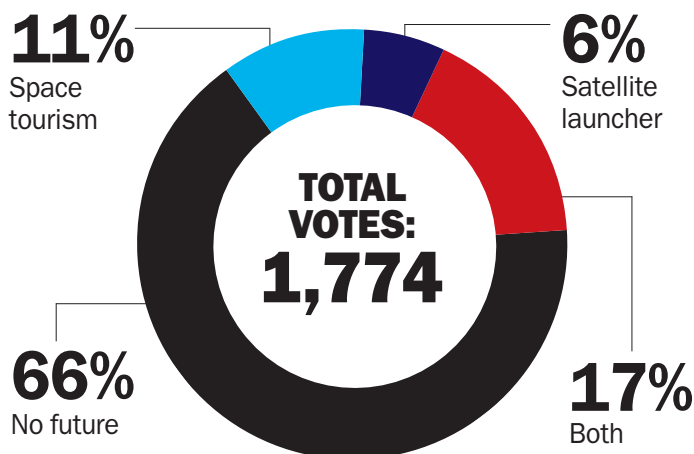
500

Flightglobal dashboard

Management and support jobs are to be cut back in Virgin Atlantic's “transformation plan” to reduce non-fuel costs

## QUESTION OF THE WEEK

Last week, we asked: **Future of Virgin Galactic...**  
You said:



This week, we ask: **Airbus's MRTT victory over Boeing in South Korea**

☐ Confirms seismic shift in tanker market ☐ Is last win before KC-46A is available ☐ Means market has room for other platforms

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# Errant deterrent

Although the United States will begin development of a next-generation strike bomber later this year, there is no guarantee the programme will bear fruit. Meanwhile, morale degrades

**T**he United States' nuclear bomber force has something of a morale problem.

This is not because of a lack of training or professionalism but, as the general in charge of the force put it to Congress recently, it's because "we have airmen flying bombers that their grandfathers flew".

The bomber squadrons see inconsistencies and uncertainty surrounding replacement aircraft, and this impacts morale. "It makes them question just how important the mission really is," the general says.

This is the stark reality that America – arguably the world's foremost superpower – faces today with its 53-year-old Boeing B-52 Stratofortress fleet.

But the B-52 – and the comparatively new Northrop Grumman B-2 Spirit – are America's only nuclear-capable bombers. Both face critical parts shortages because industry sees no business case for supporting small numbers of outdated aircraft.

## Fifth-generation fighters are nice to have, but the ability to deliver shock and awe is vital

As one congresswoman notes, America's nuclear deterrent is at a "critical inflection point". Does it get by for another few decades with Cold War weapons and geriatric aircraft, or acquire 21st Century equipment?

Sometime between now and September, the US Air Force will pick Boeing and Lockheed Martin or Northrop to develop and build the long-range strike bomber, or LRS-B. The requirement is for 80 to 100 aircraft at a cost of about \$600 million apiece. It is going to be expensive and controversial. Those quantities must be maintained or the same support problems will recur.



One is not enough

There have been numerous attempts over the last 25 years to begin a next-generation bomber, but each has been pronounced dead on arrival.

Fleet modernisation has time and again been put on the backburner in favour of expensive and poorly executed fighter programmes.

It might be nice to have a few dozen squadrons of pricey, fifth-generation fighters, but the ability to deliver "shock and awe", as it were, is vital.

Thanks in part to sabre-rattling by Russia, there is no better time to start the project from a political perspective. LRS-B has advocates in Congress – but protests, technical problems and competing funding priorities all stand in the way.

Indeed, one of the biggest threats to the nascent programme is the USA's requirement to upgrade the rest of its nuclear arsenal, notably submarines.

But with a bomber force whose age averages 39 years, the air force must get LRS-B across the line because its superpower shine is already looking a little tarnished. ■

See Defence P19

## Doors of perception

**S**afety and security have long formed a comforting alliterative pairing in airline circles – which disguises the fact that they're not necessarily the same thing.

While a police officer might suggest you fit a lock to your front door for security, a firefighter could advise you to remove it for safety.

It's a problem that is irreconcilable at its most fundamental level, which is why there can be no simple one-size-fits-all solution to cockpit protection.

Before the events of 9/11, security and safety had typically been separate – security on the ground, safety in the air. But when the armoured cockpit door was hastily ushered in to defend it against the enemy without, the flightdeck became vulnerable to enemies

within: not audacious publicity-seeking hijackers, but the cliff-edge mind-states of pilots harbouring undetected psychological pressures.

When Germanwings flight 9525 disintegrated in a southern French valley in March, the once clear-cut logic behind the secure cockpit door – already strained by the LAM crash in Namibia, the Ethiopian diversion to Geneva, and perhaps even the loss of Malaysia Airlines MH370 – shattered with it.

Europe's aviation safety authority has set itself the task of picking up the pieces and examining whether, post-Germanwings, the reasoning behind the flight-deck barrier still holds. When is a door not a door? ■

See This Week P8



For more coverage about LRS-B and other US defence topics, visit our landing page at [flightglobal.com/defence](http://flightglobal.com/defence)





# BRIEFING

## AIRBUS ADDS WIDEBODY COMPLETIONS TO TIANJIN

**FACT** Airbus has sealed a framework agreement covering the set-up of an A330 completion centre in China, following a Chinese pact to acquire up to 75 of the type. The airframer had previously signed a letter of intent with Chinese firms AVIC and Tianjin Free Trade Zone Investment Company covering the proposed creation of the facility. Under the deal Airbus will establish a completion and delivery centre at Tianjin, where it already has an A320-family final assembly line. A330s assembled in Toulouse will be flown to Tianjin for cabin fitting and painting, as well as engine runs and flight tests. Customer flight acceptance and delivery will also take place at the new facility.

## INDONESIAN HERCULES CRASH LEAVES 141 DEAD

**ACCIDENT** At least 141 people died when an Indonesian air force Lockheed Martin C-130B tactical transport crashed in a suburban area of Medan shortly after taking off on 30 June. Flightglobal's Ascend Fleets database shows that the destroyed aircraft, A-1310, had been delivered in 1961. This was the fourth major accident to involve an Indonesian Hercules in the past 15 years, including a 2009 crash of an L-100-model example which killed 97 people.

## EMBRAER TO PROVIDE NEXT ECODEMONSTRATOR

**PARTNERSHIP** Boeing and Embraer will team up for a programme of ecoDemonstrator tests using an Embraer aircraft – likely to be an E-Jet – during 2016. Boeing launched the activity in 2011 to test new technologies that can reduce fuel burn, carbon emissions and noise, and has so far used the 737-800, 787 and 757 platforms.

## PLUTO OR BUST FOR NEW HORIZONS

**SPACEFLIGHT** NASA's New Horizons spacecraft has been cleared for a close flyby of Pluto on 14 July. Mission controllers studying images from onboard cameras have decided the region around Pluto and its moons is probably free of hazardous debris that would have forced a more distant pass. Since New Horizons' January 2006 launch Pluto has been downgraded to dwarf planet, but it remains the last of our Sun's traditional satellites to be visited by a spacecraft.

## LEGION POD GETS AIRBORNE ON F-16

**TESTING** Lockheed Martin flew its new Legion Pod infrared search-and-track system with an F-16 for the first time on 30 June, with the debut made from its Fort Worth site in Texas. Additional flights on the F-16 and Boeing F-15C will be conducted throughout 2015.

## FULCRUM DEAL GIVES UNITED BIOFUEL LEVERAGE

**ENVIRONMENT** United Airlines is to invest \$30 million in biofuel producer Fulcrum BioEnergy, as it works to hedge future fuel price fluctuations. Fulcrum will supply the Chicago-based carrier with at least 90 million gallons of biofuel for 10 years after its first plant opens in 2017. The pair will develop five additional refineries adjacent to United's seven US domestic hubs, which could combine to produce up to 180 million gallons of biofuel annually.

## NEW SPACE AGE AT ESA

**ADMINISTRATION** Johann-Dietrich Wörner replaced the retiring Jean-Jacques Dordain as director-general of the European Space Agency on 30 June. Priorities for Wörner, who previously headed Germany's DLR aerospace agency, will include development of the Ariane 6 modular launch system and fostering the ongoing evolution of ESA's relationship with the European Commission.

**ROTORCRAFT** DOMINIC PERRY LONDON

# Bristow unsure on first AW189 base

Delayed introduction of new search and rescue helicopter forces operator to proceed with 'plan b' for UK operations

**B**ristow Helicopters has yet to decide which of its UK search and rescue bases will be the first to operate the AgustaWestland AW189, following development delays to the SAR variant.

So far, Bristow has taken delivery of three of an eventual 11 SAR-rolled examples of the 8.3t medium-twin, but these are not yet operational.

Inverness, the first base originally destined to utilise the AW189, went live on 1 April flying the Sikorsky S-92 as a contingency measure. Lydd, the next AW189 site to come on line in late July, will also not initially use the type, says Bristow Group chief executive Jonathan Baliff.

Speaking at a Paris air show event, Baliff said its "plan B" is to operate a pair of smaller AW139s in the role.

The first base to take the AW189s is "yet to be determined", says Baliff. "As soon as they are tested and available we want to get them working," he says.

Bristow's proposal to the UK government for the work was based on a 10-base solution with an even split of both AW189s and S-92s. Baliff says its ultimate aim is to have "11 of both types working fully".

Delays to the introduction of the AW189 partly stem from slower-than-expected certification of the required full icing protection system (FIPS) used on the helicopters.

An additional Bristow S-92 site in Caernarfon became operational on 1 July. It takes over from the Royal Air Force's 22 Sqn at RAF Valley, Anglesey. ■



## DEBUT

## 525 Relentless rises over Texas

Bell Helicopter on 1 July performed the first flight of the new super-medium-class 525 Relentless from its facility in Amarillo, Texas.

The maiden sortie of the GE Aviation CT7-powered twin was initially scheduled for late last year.

"The first flight test started with taxi testing and manoeuvres and then went into an initial hover. We performed various hover manoeuvres and then tested low-speed handling qualities with winds gusting to 20kt [37km/h]," says senior flight test pilot Jeff Greenwood.

Since its launch at the 2012 Heli-Expo show Bell has amassed over 60 tentative commitments for the 525, with more than 20 added at last month's Paris air show.

Secure flightdeck  
doors questioned  
**THIS WEEK P9**

ACQUISITIONS JAMES DREW WASHINGTON DC

# MRTT wins Korean, Australian orders

Airbus multi-role tanker transport receives commitments from Canberra and Seoul as it sweeps aside Boeing's KC-46A

**A**irbus Defence & Space has received a double boost, with South Korea added to its growing list of A330 multi-role tanker transport (MRTT) customers and existing operator Australia ordering an additional two examples.

Seoul's Defense Acquisition Program Administration on 30 June selected an Airbus offer ahead of Boeing's KC-46A Pegasus and an Israel Aerospace Industries proposal also based on the Boeing 767, citing the performance and price of the European type.

Worth \$1.26 billion, South Korea's KC-X programme aims to deliver four aircraft by 2019. Its selection of the Airbus model could also be an important victory for the airframer, which is looking to an upcoming Japanese tanker competition.

Boeing appeared confident days ahead of the decision, touting estimates that the KC-46A it is developing for the US Air Force will cost 25% less to own and operate over its lifecycle compared with the A330 MRTT, despite a higher initial price tag.

However, the MRTT is a much larger aircraft than the 767-based KC-46A, with capacity to carry 111t (245,000lb) of fuel and up to 300 troops. South Korea's boom-equipped examples will be powered by Rolls-Royce Trent engines.

The Royal Australian Air Force also confirmed on 1 July that it will purchase a further two MRTTs, for delivery in 2018. The twinjets will be converted from A330-200s previously belonging to Qantas via a deal worth A\$408 million (\$314 million), taking the nation's MRTT fleet to seven. ■

## A330 MRTT ORDERS

Nation/group	Active	Orders	Pending
Australia	5	2	
EDA			4*
France		1	11
India			6
Qatar			2
Saudi Arabia	4	2	
Singapore		6	
South Korea			4
UK	12	2	
UAE	3		
<b>Total</b>	<b>24</b>	<b>13</b>	<b>27</b>

SOURCE: Flightglobal's Ascend Fleets database/European Defence Agency\*

REPORT GREG WALDRON SINGAPORE

# Pilot shut off wrong engine before TransAsia crash

**A**n initial factual report into the fatal crash of a TransAsia Airways ATR 72-600 (B-22816) on 4 February confirms that the pilot flying retarded the aircraft's only operational engine.

The Taiwan Aviation Safety Council says that after flight GE235 took off from Taipei's Songshan airport, the pilot flying retarded the port-side number 1 engine following flame-out of the starboard powerplant at 1,200ft.

This corroborates analysis of data from the aircraft's flight data recorder, released on 6 February, which showed the fuel to engine 1 was shut off around 1min after the opposing engine failed.

Although the report is purely factual, and will be followed by



The ATR 72-600 crashed into the Keelung River, killing 43 people

an analysis report in April next year, it does point to a confused situation in the cockpit.

Just 3s after the flame-out occurred, the aircraft's autopilot was disengaged while climbing through 1,300ft.

Then, 2s later, the pilot flying is heard saying: "I will pull back engine one throttle."

Although the co-pilot urges caution, the flight data recorder indicates a sharp reduction in the angle of the engine 1 power lever.

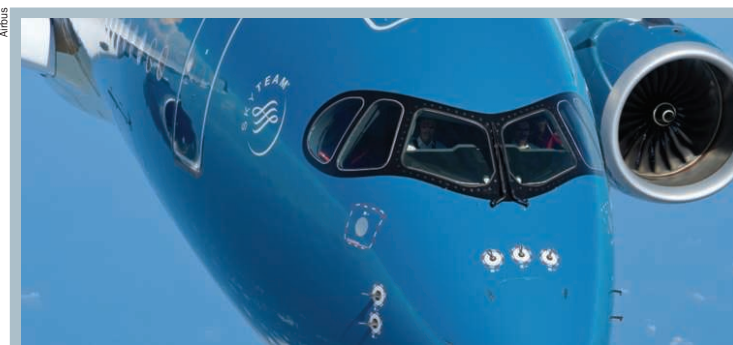
As the ATR reached 1,630ft it started to descend. This was followed by a stall warning and the activation of stick-shaker alarms.

The crew were still unaware that that they had retarded the wrong engine, pushing the engine 2 throttle forward, while further retarding engine 1.

Subsequently, the engine 1 condition lever was placed in the fuel shut-off position, and the propellers were feathered.

A further 20s passed before the pilot monitoring declared an emergency flame-out.

Although the crew attempted to restart the engine, the turbo-prop crashed into the Keelung River, killing 43 of the 58 people on board. ■



## DELIVERY

### Vietnam Airlines receives A350-900

Vietnam Airlines has become the second airline in the world to operate the Airbus A350-900, following a ceremony held in Toulouse on 30 June.

The widebody twinjet was delivered to lessor AerCap on lease to the airline for operation on long-haul routes, and arrived in Hanoi the following day.

The carrier intends to acquire 14 Rolls-Royce Trent XWB-powered A350s: 10 directly from Airbus and four from lessors.



INVESTIGATION DAVID KAMINSKI-MORROW LONDON

# Secure flightdeck doors questioned

European task force examining risks of reinforced cockpit access in light of deliberate crash of Germanwings A320

**S**afety risks associated with reinforced cockpit doors will form part of an analysis due to be presented later this month by a European task force established after the Germanwings Airbus A320 crash.

The task force is to hold its final meeting on 16 July and put its conclusions to the European transport commissioner, Violeta Bulc, by the end of the month.

European Aviation Safety Agency executive director Patrick Ky told a transport committee hearing on 29 June that the group was having to balance considerations of safety against security.

"By having a look at security requirements for cockpit doors, we may have created some safety haz-

ards – and vice-versa," he said.

"If we look at the cockpit door just from a pure safety point of view – and get rid of the reinforced cockpit door, for instance – it is certain we're going to create security hazards."

Preliminary investigations into the 24 March crash in the French Alps indicated that the first officer deliberately put the A320 on a collision course with high terrain as soon as the captain left the flightdeck. The secure cockpit door meant the captain was unable to regain access.

Secure doors were introduced after the hijacking of several US aircraft during the co-ordinated assault on New York and Washington DC in September 2001.



The 24 March crash is thought to be a result of pilot action

European Commission aviation safety unit head Filip Cornelis says the industry is still in consensus that reinforced cockpit doors "are still an essential requirement".

The task force is looking into various issues arising from the event, including the subsequent recommendation that airlines adopt the "four eyes" principle

by ensuring two crew members are always present in the cockpit.

"Should we mandate it, knowing it is not mandatory in the USA?" Ky asks. He also points out that there are cases in which the cockpit is too small to accommodate a flight attendant without their sitting in the seat of the absent pilot, which itself creates a potential safety risk. ■

AIRPORTS GRAHAM DUNN LONDON

## Heathrow hails runway verdict

**T**he operator of London Heathrow airport has welcomed the UK Airports Commission's recommendation on 1 July that the UK should develop a third runway at the airport to meet future capacity requirements, though the rival short-listed candidates believe they remain in the race.

Commission chairman Howard Davies describes its conclusions as "clear and unanimous" in recommending expanding Heathrow's capacity through a new northwest runway. A final decision – albeit one that will no doubt be subject to legal challenge – will be made by the government before the end of the year.

Operator Heathrow Airport says it welcomes the "clear recommendation" to expand the west London hub.

The commission's proposal for growth at Heathrow is not unconditional, however, and calls for measures such as a ban on night flights and a firm parliamentary



Nearby homes face demolition

commitment not to pursue a fourth runway.

A new runway could be operational by 2026, believes Davies. However it will require the demolition of many properties, including in the nearby village of Harmansworth.

Gatwick, meanwhile, believes it is still in the race after the commission called its proposal for a second runway as a "credible option", albeit for "short-haul intra-European routes" which would deliver "considerably smaller" economic benefits than Heathrow. ■

AIRLINES GHIM-LAY YEO WASHINGTON DC

## Subsidies review will be fair, Emirates promised

**E**mirates Airline says it has been assured by the US government that it will assess the ongoing dispute over alleged subsidies to Gulf carriers without bias towards the nation's big three carriers.

"We were assured by each department that they would examine this case on the facts, that they would not be influenced by theatre, tactics, or whatever," said Emirates president Tim Clark at a media briefing in Washington DC on 30 June.

Clark met the previous day

with officials from the Departments of Transportation, State and Commerce. The three agencies are tasked with reviewing the allegations made by Delta Air Lines, American Airlines and United Airlines that Emirates, Qatar Airways and Etihad Airways have received more than \$42 billion in state subsidies.

Emirates has also filed its formal response to the allegations. The 210-page report is a point-by-point rebuttal of the US carriers' accusations, says Emirates.

Clark says the US authorities have been open to its comments. "They've been receptive, they've been listening. They've been very anxious to receive this document to put some balance in the argument," he says. "This inter-agency group will eventually – I hope – come up with an assessment from the facts and do the right thing." ■

**"They've been listening. They've been very anxious to ... put some balance in the argument"**

**TIM CLARK**  
President, Emirates





How to ALTA  
a region's  
safety culture  
**AIR TRANSPORT P10**

**THIS WEEK**

**SAFETY** DOMINIC PERRY LONDON

# Collision averted by sheer 'chance'

UK airprox board determines incident between RAF Typhoon and Tucano trainer constituted "very high" risk of crash

A pair of Royal Air Force aircraft came within "20-50ft" of a high-speed collision in March this year, with only luck preventing an accident, UK safety investigators have determined.

Disclosed by the Civil Aviation Authority's Airprox Board (CAAB), the 12 March incident involved a formation of three Eurofighter Typhoons and a Shorts Tucano T1 turboprop trainer over RAF Coningsby in Lincolnshire, eastern England.

Having observed the Typhoons approaching from astern "with a high overtake speed", estimated at around 190kt (388km/h), the instructor in the rear seat of the Tucano was forced to initiate evasive action and take control from his student after he saw the lead

aircraft "initiate a break directly towards him" from only 100-200m (330-660ft) away.

"Without time to say 'I have control', he aggressively pushed forward on the control column and heard the jet noise of the Typhoon as it passed directly overhead in a right-hand breaking turn," says the CAAB report.

"The instructor assessed that the Typhoon's right wing-tip was within 20-50ft of the Tucano," it says.

Although the Typhoon pilots were informed of the presence of the Tucano, which had been conducting a touch-and-go manoeuvre ahead of them, "all three formation pilots perceived that the Tucano had transited down and was past the upwind end of the runway", the report says.



Down Copyright

**The Typhoon was 20-50ft away**

The pilot of the lead Typhoon then made a visual scan of the Coningsby runway to check for other aircraft before breaking to join the circuit to land, but did not detect the Tucano.

However, the CAAB reveals, he "first saw the Tucano at the point at which he rolled right to break, directly below his aircraft" which required him to take "immediate

evasive action up and away". Visibility was good at the time of the incident, at around 16:00 local.

Pilots of both aircraft assessed the risk of collision as "very high", with the CAAB classing it as a category A incident – the most serious on ICAO's risk scale.

The CAAB concludes that a number of factors were at play during the incident but "the fact that the Typhoon pilot did not gain visual contact with the Tucano before breaking into the circuit was contributory to the airprox".

The Typhoon had "flown into conflict with the Tucano", it says, and "chance had played a major factor in the aircraft not colliding". It emphasises that all traffic in a circuit needs to be visually identified before a break is commenced. ■

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# How to ALTA a region's safety culture

Latin American and Caribbean carriers and regulators are collaborating to cut the number of fatal accidents in the bloc

**C**ommercial aviation safety in Latin America and the Caribbean has significantly improved in recent years, thanks to industry-wide collaboration to tackle the leading causes of accidents in the region.

That was the positive message delivered at the Pan American Aviation Safety Summit, which took place late last month in Medellin, Colombia.

Gerardo Hueto, chief engineer of aviation systems at Boeing, told delegates that the fatal accident rate in the region was 0.37 events per million flights in 2014, down from a five-year average of about 0.6 in 2010 and from a high point of 0.96 last decade.

In fact, 2014's rate is nearing the goal set by ICAO's safety body for the bloc, the Regional Aviation Safety Group for Pan America (RASG-PA), which is targeting an accident rate decline of 50% between 2010 and 2020, or to 0.3 events per million flights.

Melvin Cintron, ICAO's regional director for North America, Central America and the Caribbean, says: "I believe this organisation, and the work we are doing together, can get us there."

## GREATER DATA

Speakers at the summit pinpointed data sharing between operators and regulators as key to the improvement. Eduardo Iglesias, chief executive of the Latin American and Caribbean Air Transport Association (ALTA), says most of the body's roughly 30 airline members upload aircraft data monthly to an IATA website.

RASG-PA, established in 2008, analyses that data and uses it to develop safety improvement plans that are then distributed to carriers.

So far, its work has covered areas such as runway excursions, controlled flight into terrain and loss of control in flight – the factors that account for the bulk of fatal incidents.



Brazilian carrier Gol has introduced a revised pilot training syllabus to tackle loss of control incidents

"We are all in absolute agreement that these efforts produce an important contribution to safety," says Hueto, who is also co-chair of RASG-PA.

Iglesias says data allows safety experts to track the frequency of potentially dangerous flight conditions and aircraft-generated warnings – for instance, altitude deviations leading to unstable approaches, or events triggering an aircraft's traffic collision avoidance system (TCAS) – and to identify regions or airports where events tend to be more common.

Iglesias believes the initiative is particularly useful for the region's carriers, which operate across many national boundaries in an area with challenging

topography and climates.

While Latin American carriers were not the first to participate in such a data-sharing programme, with US carriers undertaking the sharing of domestic flight data, they have led the way in distributing the information internationally, Iglesias says.

The effort has led to meaningful changes. A high incidence of TCAS warnings triggered over central Brazil led regulators to establish new flight paths.

Dan Guzzo Comite, safety manager at Brazilian carrier Gol, says it studied loss of control during flight, then began training pilots to properly respond to inaccurate airspeed indications and stick-shakes at high altitudes, and to avoid steep bank angles at particularly low altitudes.

Despite the improvements, rapid growth of the region's aviation industry could reverse some of the progress, warns Cintron. "[Growth] is positive, but when it comes to safety it can actually be negative," he says.

Passenger traffic carried by ALTA's airlines doubled in the

past 10 years, and could double again over the next decade to 450 million passengers annually, Iglesias says.

Challenges include shortages of skilled workers, says Cintron, noting that newly qualified pilots can owe as much \$180,000 in loans, far more than can be paid off quickly on a typical starting salary.

The staff shortage may become more acute following the introduction in 2013 by the USA of a rule mandating that pilots have 1,500h of flight time before working for commercial carriers.

## KNOCK-ON EFFECT

Without criticising the rule – largely prompted by the crash of a Colgan Air-operated Bombardier Q400 near Buffalo in 2013 – Cintron cautions that aviation accidents can spur political moves that create unforeseen consequences.

He points out that even a pilot who has accumulated only a few hundred hours of multi-engine, all-weather flight time has more practical, real-world experience than a general aviation pilot with many more hours. ■

**"We are all in absolute agreement that these efforts produce an important contribution to safety"**

**GERARDO HUETO**

Chief engineer of aviation systems at Boeing





Lufthansa Cargo  
plans to deliver  
quieter freighters  
**AIR TRANSPORT P12**

**FLEET** RAINER UPHOFF MADRID

# A330neo's economic appeal turns TAP off its A350 order

New majority owner switches planned fleet renewal to Airbus's in-development widebody

**T**AP Portugal has dropped its order for the Airbus A350 and will instead acquire the A330neo in a fleet renewal kicked off by the airline's new majority owner Atlantic Gateway.

Atlantic Gateway – partly owned by JetBlue Airways and Azul founder David Neeleman – now plans to acquire 14 A330-900neos and 39 A320neo-family aircraft for TAP.

TAP had held orders for a dozen A350-900s. "We already talked to Airbus to change the order of 12 A350s for 14 A330-900neos," said Neeleman at a late June press conference.

Atlantic Gateway was selected by the Portuguese government as the buyer of a 61% stake in TAP, beating Avianca owner German Efromovich to the share. Neeleman is a 49% shareholder at Atlantic Gateway, with the other 51% held by Humberto Pedrosa, who owns European bus company Grupo Barraqueiro.

The consortium will invest about €600 million (\$674 million)



**TAP Portugal already operates 14 examples of the current A330**

in TAP. This comprises a €270 million capital infusion on the closing of the agreement with the Portuguese government, and another €75 million in 2016. In addition, Atlantic Gateway will provide more than €250 million in pre-delivery payments for new aircraft over the next two years.

Neeleman says the A350 is "a riskier option" than the long-range variant of the A321neo and the A330-900neo, which have lower trip and seat-kilometre costs for TAP's network.

The long-range A321neo will allow TAP to expand in the USA and Brazil. "Any city with more than a million inhabitants with no current flights to Europe that is within the range of the A321[neo] LR from Lisbon is a potential candidate to become a destination of TAP," says Neeleman.

The future of TAP's regional carrier Portugalia, which operates an ageing fleet of Embraer 145s and Fokker 100s is less certain. "I only know that they need a new fleet," says Neeleman. ■

**INVESTIGATION**

DAVID KAMINSKI-MORROW LONDON

## Condor clear on visual pointers during descent

**G**erman carrier Condor has reinforced the importance of acquiring visual references before continuing below minimum descent altitude on approach, after a serious incident involving an Airbus A320 in the Canary Islands.

Spanish investigation authority CIAIAC previously disclosed that the crew unwittingly referenced the wrong navigation beacon while on a non-precision approach to Tenerife South airport.

Visibility had been reduced by thunderstorms. The aircraft descended to just 435ft above ground, while still 6nm (10km) from runway 08, before a ground-proximity warning spurred the pilots to execute a go-around.

CIAIAC states, in its final report into the 11 December 2013 event, that the pilots descended below the minimum altitude without a clear view of the runway.

Condor has strengthened its missed-approach training regime as a result of the incident, says CIAIAC. It also recommends that crews be advised of the use of ground-proximity terrain databases as an additional resource. ■

**MANUFACTURING** TOM ZAITSEV MOSCOW

# Russia plans returning Il-114 to serial production

**I**nitial planning is under way in Russia to restart manufacture of the mothballed Ilyushin Il-114 regional commuter turboprop.

The country's industry and trade ministry says it is drawing up a scheme jointly with Ilyushin and its parent United Aircraft to cover serial production of the aircraft. A draft decision to launch the project will be submitted for approval by the government at the end of July.

An assembly facility for the 64-seat aircraft is still to be determined, but Moscow's Chernyshev engine plant has been chosen as a supplier of modernised Klimov TV7-117SM turbo-

props for the type. The Il-114's chief designer Sergei Gromov says the revived turboprop will be dubbed the Il-114-300 and deliveries of the baseline passenger variant are "tentatively sched-

uled to start in 2018. This could provide a platform for three [derivatives], including a light transport, a military patrol aircraft and an 'Arctic' version fitted with a ski landing gear."



**Uzbekistan Airways has four examples of the turboprop in service**

Demand for all four proposed versions is estimated at 320 units over the 2019-2030 period.

Tashkent-based airframer TAPO built 17 Il-114s, including several prototypes, before shutting down production in 2012. Uzbekistan Airways remains the type's sole operator, with four aircraft in service and three in storage.

Interest in restarting Il-114 production comes after a deal between Bombardier and state-owned Rostec was set aside last year. The long-running talks had been focused on setting up a Q400 final assembly line at a new facility in Ulyanovsk. ■



PRODUCTION

STEPHEN TRIMBLE WASHINGTON DC

## Boeing to cut 747-8 output to one per month

Despite scoring recent sales success with the 747-8 Freighter, Boeing has announced yet another rate cut for the programme – the fourth over a two-year period – lowering output to only one aircraft per month from March 2016.

The latest planned reduction will trim the monthly production rate for the 747-8 by half compared with where it stood in early 2015.

Boeing is currently building 747-8s at a rate of 1.5 per month, which will fall to 1.3 aircraft per month in August, as a result of a previously announced move.

“We are making the right decisions to allow us to continue to run a healthy business with a change to our production rate,” Boeing says.

In early 2014, one Boeing supplier, LMI Aerospace, said any rate below 1.5 per month for the 747-8 would be financially costly for the supply chain, although Boeing subsequently claimed that cost reductions instituted over the past year meant that a rate of one aircraft per month was financially feasible.

The announcement comes despite a morale boost the programme received in mid-June at the Paris air show, when Russian cargo operator Volga-Dnepr signed a memorandum of understanding to buy up to 20 747-8Fs.

“We continue to believe in the long-term strength of the freighter market and the 747-8 is uniquely positioned to capture this demand; of note is the 747-400 freighter replacement market, which begins next decade,” Boeing says. ■



Volga-Dnepr will take more -8Fs



Lufthansa Cargo will evaluate the modifications in flight conditions before rolling them out across 14 aircraft

ENVIRONMENT MICHAEL GUBISCH LONDON

## Lufthansa Cargo plans tests to deliver quieter freighters

Carrier to assess engine air intake and landing gear cover changes on Boeing MD-11s

Lufthansa is evaluating modifications to its fleet of Boeing MD-11 freighters aimed at significantly reducing the trijet's noise footprint.

The airline will assess the potential benefits of employing modified panels in engine air intakes as well as covers for certain cavities in the landing gear assembly during flight tests at Magdeburg-Cochstedt airport, around 200km southwest of Berlin.

Two MD-11Fs will be deployed to conduct flypasts in different flight configurations and at varying heights over several noise-measuring stations at the airport. Lufthansa says the tests will last several days and are

scheduled to be conducted over the next few weeks.

The airline's maintenance arm, Lufthansa Technik, has trialled hardwall acoustic panels for the aircraft's GE Aviation CF6-80C2 engines at its test cell in Hamburg.

But the effectiveness of the components needs to be validated in flight conditions before the carrier decides whether to roll out the modification across its MD-11F fleet, it says.

Lufthansa says the air intake panels and landing gear changes can potentially deliver “significant” noise reductions, but flight tests are necessary for the modifications' approval.

The effort is part of a project called MODAL – or models and data for the development of active noise-abatement measures in aviation – conducted in partnership with German aerospace research centre DLR.

Lufthansa Cargo operates 14 MD-11Fs – in addition to five Boeing 777Fs – and has stored two of the legacy type, Flightglobal's Ascend Fleets database shows.

Lufthansa has an ongoing initiative to cut the noise produced by its passenger aircraft fleet through the installation of small vortex generators around fuel-tank vents on the wings of its Airbus A320s. ■

SAFETY DAVID KAMINSKI-MORROW LONDON

## Europe retains ban on Iran Air A320s

Iran Air has been trying to persuade authorities to ease restrictions and allow its Airbus A320s to operate within European airspace.

But the effort to lift partially the prohibition on the airline's flights has so far proved unsuccessful.

Initial restrictions on the Iran Air fleet were imposed in 2010

and subsequently expanded to cover several aircraft types, including the A320.

Support documentation accompanying the European Commission's latest blacklist revision states that Iran Air has provided information on its current fleet and “requested to exclude” the A320 from operational restrictions.

“However, it has not been possible to this day to verify the evidence provided through a technical meeting [or] on-site assessment visit,” the documentation says.

As a result, the European air safety committee – which oversees the blacklist process – has been unable to reach a decision on permitting resumption of Iran Air A320 services. ■



# France will take the spotlight as “feature country” at Singapore

Singapore Airshow 2016 will welcome France as the Feature Country in the fifth edition of the show, scheduled to take place from 16 to 21 February 2016, at the Changi Exhibition Centre.

The Feature Country series, which made its debut at the 2014 Airshow, was developed as a permanent feature to enable the companies exhibiting within the pavilion to leverage on the Singapore Airshow as a strategic platform; lending support to businesses of the Feature Country and enabling them to tap the opportunities in the Asia Pacific region and beyond.

The French Pavilion will be located at a prominent spot within the exhibition hall. Participating exhibitors will have access to a dedicated “Deminar” area – a demonstration and seminar area for research institutes and universities to showcase their latest technologies and innovations. In addition, business meetings between the French Pavilion exhibitors and VIP delegations will also be specially facilitated.

“Being a Feature Country at the Singapore Airshow 2016 gives us the unique platform to bring together our latest and best aviation technologies to meet the growing appetite for innovation in the Asia Pacific aviation sector, translating into real business deals for our French companies,” said Emeric D’Arcimoles, the Paris Air Show Chairman and Chairman of the



International Committee of Groupement des industries françaises aéronautiques et spatiales.

The French aerospace, defence and security industry is worth 47.9 billion Euros, and specifically, out of which 30.4 billion Euros is contributed by exports. This shows that France is well-placed to leverage its Feature Country platform to bring its latest innovations to the region's top decision-makers converging at Singapore Airshow 2016.

This comes at an opportune time in the Asia Pacific aviation industry, where the com-



an **experia** event

mercial aerospace sector is expected to set new records for aircraft production in 2015, off the back of the accelerated replacement cycle of obsolete aircraft and growing passenger travel demand in the Asia Pacific region. Countries in the region are also increasing defence spending to equip their militaries with modern defence platforms and technologies.

Reflecting this growth is the continued expansion of reach and impact of each new edition of Singapore Airshow. The 2016 show is already 80 per cent committed, with specialised spaces like the Aerospace Emerging Technologies Zone, the Training and Simulation Zone and the introduction of the Business Aviation Zone, to further spawn business development opportunities.

For more information about the Feature Country programme, please contact Mr Danny Soong at [dannysoong@experiaevents.com](mailto:dannysoong@experiaevents.com) or +65 6595 6123.

## Hosted Buyers Programme offers new partnership opportunities

Buyers seeking specific products and solutions at Singapore Airshow 2016 can now leverage on the Hosted Buyers business matching programme to source



new contacts and explore new ventures. Accorded with a complimentary 4-day Hosted Buyer Pass and exclusive hospitality arrangements during the trade days, each eligible buyer will enjoy a hassle-free business meeting experience as pre-scheduled meetings are facilitated with exhibitors that match their requirements.

For more information about the Hosted Buyers Programme, please contact Ms Liliane Lye at [lilianelye@experiaevents.com](mailto:lilianelye@experiaevents.com) or +65 6595 6126.

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PRODUCTION ROB MORRIS LONDON

# The narrowbody rate debate

Are Airbus and Boeing taking a risk with planned increases to single-aisle aircraft outputs?

Just before the Paris air show, Airbus's chief commercial officer, customers, John Leahy, once again raised the prospect of the airframer increasing the production rate of its ubiquitous A320 single-aisle family to 60 aircraft per month by 2018.

Boeing has also talked about prospects for production of its 737 family increasing to a similar rate, raising the spectre of more than 1,400 narrowbody aircraft delivering annually from the two leading manufacturers by the end of this decade. And with Bombardier, Comac and Irkut also aspiring to bring aircraft to the market in this sector, annual deliveries could be even higher.

At the same time, Ascend consultants continue to hear questions from the market, particularly from investors and operating lessors, over the justification for such rate hikes. At present, demand for new aircraft remains robust and backlogs are at record highs, albeit for delivery over a significantly longer horizon than has historically been the case. It is this strength of demand that the original equipment manufacturers cite as justification for their plans. But the naysayers point to enduring industry cyclical and

potential for some "black swan" event – another 9/11 or a global financial crash, say – as risks that could weaken demand even as OEMs increase their rates.

## EVOLVING RISK

Simple trend analysis and arithmetic can help us to understand the issues at play here and quantify any evolving risk. Our Ascend Fleets database gives us the starting point at the end of 2014 of 12,561 single-aisle passenger jets in service. Under current production rates and future committed rate increases, Airbus and Boeing are estimated to be planning to deliver 1,002, 1,040, 1,117, 1,192 and 1,212 single-aisle aircraft annually between 2015 and 2019. Each OEM is producing at rate 42 today, with Airbus increasing to rate 50 by early 2017 and Boeing increasing to rate 52 in 2018.

Deducting around 400 aircraft retirements from the current fleet annually, which is the average single-aisle retirement volume seen since 2008, and also adjusting the delivery stream to remove the typical 2.5% of single-aisle deliveries that go into non-passenger roles (such as corporate jets or special-mission aircraft), results in an average annual sin-

gle-aisle fleet growth over that period of 4.9%. As illustrated in the table (*below right*), that is marginally above the long-term trend since 1990 and also above the average annual growth of 4.3% we have seen since 2008 and the average annual growth of 3.8% over the past 10 years.

So under current rate plans and fleet trend, there does appear to be a small potential surplus of single-aisle deliveries over the next five years. This analysis also neglects to include those evol-

**"For the current production to be absorbed, a global capacity growth of 4.9% is required"**

ing new programmes mentioned earlier. With the C-Series finally set to enter service next year, and Comac and Irkut aiming to bring their products to market before the end of this decade, any evolving surplus would be inflated by a few hundred more aircraft.

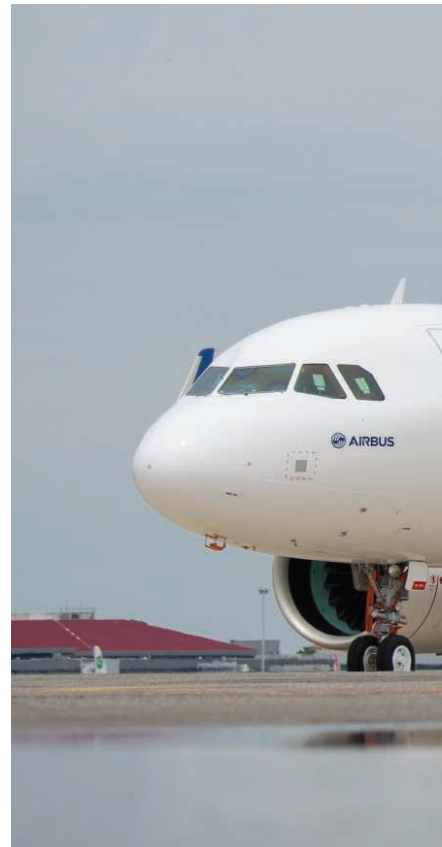
Thinking about potential rate 60 at each of Airbus and Boeing, with the former speaking about some time in 2018 and the latter

perhaps reacting with a similar increase by 2019 as it transitions the 737 to an all-Max output, the fleet growths seen in 2018 and 2019 increase significantly above the trend, to 5.7% and 6.5%, respectively (still assuming 400 retirements annually).

What are the implications of such potential fleet growth? Analysis of our Innovata airline schedules database indicates that over the past 10 years average single-aisle seats per departure have increased by 0.9% per annum and average single-aisle sector length has increased by 0.8% per year.

At the same time, overall capacity offered by single-aisle aircraft has increased by 6.2% per annum on average. Over that same 10-year period, the single-aisle fleet growth has been 3.8% per annum, indicating that increasing installed seats, longer sector lengths and increased aircraft utilisation have driven productivity increases in this sector of 2.4% per annum.

Returning to the currently committed production scenario, if we assume the same productivity increases endure over the next



Delivery of 737 aircraft from the Boeing production lines is expected to reach rate 60 by 2019





**PZL-Swidnik goes to court over Polish helicopter deal**  
**DEFENCE P16**



**Airbus is already on track to be building 50 A320s per month by early 2017**

five years, the average 4.9% fleet growth implied will deliver 7.3% more single-aisle capacity. And the “rate 60” scenario set out actually implies a 7.7% single-aisle capacity growth over the next five years.

There is one final variable in this capacity balance equation. Again returning to Innovata, over the past 10 years the share of global scheduled airline capacity flown by single-aisle aircraft has increased by 2.4% per annum so that, in 2015, 52.6% of the overall network will be flown by such aircraft types.

If we extrapolate this trend over the next five years, this growth effectively cancels out the productivity gains and implies that for the current committed production to be absorbed into the fleet, a global capacity growth of 4.9% is required. Assuming that increasing airline efficiency continues to drive load factors upwards, that would require average global annual passenger growth in excess of 4.9% over the next five years. And for the “rate 60” scenario, that growth would need to be in excess of 5.3%.

With 2015 traffic growth in the year to date of 7.4% at the global

level, these scenarios suddenly sound achievable. But we should not forget that, despite the ongoing development of three new programmes in this sector, this calculation omits the presence of any of those players arriving to market before the end of the decade. The CSeries, at least, will certainly achieve that, thereby increasing the traffic growths required to assimilate the new single-aisle deliveries into the fleet. Also, our enduringly cyclical sector is already seven years into the current cycle, which began with the downturn in 2008. While every cycle is different, the risk

that the increasing rates arrive towards the back end of this cycle must be at least borne in mind, since any decline in new aircraft demand in the face of these increased rates can lead only to increasing retirement rates as airlines adjust capacity plans to more closely match demand.

#### NEW COMPETITORS

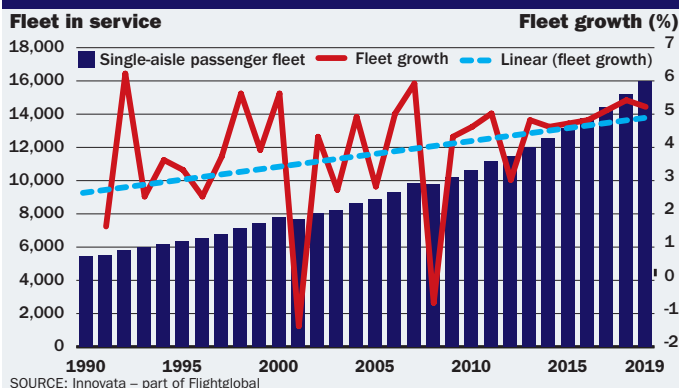
But at face value this macro calculation suggests that there is justification for current and future planned single-aisle production rates. However, that justification leaves no room for new competitors and requires the current ag-

gressive shift of capacity into single-aisle (from both twin-aisle and regional jets) to be sustained. With twin-aisle production rates also increasing as the 787 and A350 continue their ramp-ups, the assumption of continuing capacity shift into single-aisle aircraft looks like a risk. It also requires 2,000 of today’s 13,000 or so passenger single-aisles to be retired from the fleet in the next five years – which, incidentally, would result in all passenger single-aisles built before 1996 retiring from service over that period.

Any increase beyond planned rates, all the way to rate 60, may be a different proposition, though. Towards the end of the decade, when the downturn risk increases, single-aisle fleet growths will need to accelerate further if this scenario is to be accommodated. Ascend will continue to observe OEM plans with interest and monitor developments in this fascinating supply- and demand-driven market. ■

**Rob Morris is head of consultancy at Flightglobal’s Ascend advisory and consultancy service**

#### SINGLE-AISLE PASSENGER FLEET GROWTH





MRH90s have been affected

## FAULT DOMINIC PERRY LONDON NHI to redesign rotor hub stops for NH90 fleet

**N**H Industries (NHI) says it is working to deliver a solution to an issue with the main rotor head on NH90 military helicopters that can allow the blades to impact the tail structure when starting or stopping the rotors during high winds.

Although the problem only appeared in the media over the past week, after tests with Australia's MRH90 Taipan fleet, NHI says that other operators have also experienced the same phenomenon.

The NH90 is fitted with stops on the rotor hub, which prevent excessive blade flapping during low-RPM operations, but then retract as the disc spins up.

However, it appears that in some conditions the stops remain jammed in their closed position at rotor start and then sustain damage due to the blade flap.

Australia's defence department says that its MRH90s have twice experienced the problem, resulting in "main rotor head damage". In both cases the rotorcraft were embarked on Royal Australian Navy vessels – the HMAS *Success* in 2014 and, in March this year, during flight trials aboard the service's new landing helicopter dock, HMAS *Canberra*.

"The second incident resulted in minor aircraft damage, which is currently under investigation," it says, while noting that the 11t-class MRH90 continues to operate from other navy ships.

NHI says it is "redesigning the upper stops", with the modification to be introduced in 2017, although it hopes to accelerate the process. ■

LAWSUIT DOMINIC PERRY LONDON

# PZL-Swidnik goes to court over Polish helicopter deal

AgustaWestland subsidiary says ministry committed serious violations in tender process

**P**ZL-Swidnik has launched a legal action in an attempt to overturn Poland's recent selection of rival Airbus Helicopters for a 50-rotorcraft deal, with the former's parent company warning over the future direction of the manufacturer.

In April Poland's defence ministry picked the H225M Caracal ahead of the Polish Agusta-Westland subsidiary's offer of the AW149 and Sikorsky's S-70i Black Hawk/S-70B Seahawk for the tri-service requirement.

PZL-Swidnik claims that the criteria used for the contest were "questionable" and is now seeking to have the award

annulled without any bidder being selected.

In its lawsuit, filed to the Warsaw district court, PZL-Swidnik claims that the country's defence ministry committed "serious violations" during the tender process, including last-minute rule changes and "violations of laws relating to offset".

The manufacturer claims that it warned the authorities in writing of potential rule breaches during the contest.

"Unfortunately, in this case we have not received any answer and the infringements are now the subject of a complex lawsuit," it says.

The rule breaches have led to a decision that is "not in the best interests of the Polish armed forces, the Polish aviation sector, and the Polish taxpayers", it says.

In addition, its workforce is "threatened" by the loss of the contract, it adds.

AgustaWestland says it is too early to comment on the potential for job losses at its Polish subsidiary, but adds: "It is clear that, if this is the situation, then PZL [Swidnik] cannot in the medium- or long-term keep the industrial role that it has had so far and that we had planned for it.

"It cannot have the design role for the AW149 that we had envisaged – it was going to be the export hub for the platform."

PZL-Swidnik's recourse to legal action has inevitably led to speculation that Sikorsky, or its local subsidiary, PZL Mielec, could follow suit. However, Sikorsky declines to comment.

Airbus Helicopters, which has promised to set up a production facility for the 11t H225Ms in Lodz, Poland, also declines to comment on the case.

For its part, the Polish defence ministry says it is "convinced" that the process will "prove all tender actions were taken in conformity with the law".

No date has so far been set for the case. ■



The AW149 was put forward by PZL-Swidnik for the tri-service bid

ACQUISITION BETH STEVENSON LONDON

## C295W appears in Uzbekistan livery

**T**he Uzbekistan air force has purchased four Airbus Defence & Space C295W medium transports that were ordered following a visit to the manufacturer in 2014, it is believed.

A picture has appeared online of the type in an Uzbekistan air force livery conducting its maiden flight on 17 June from the com-

pany's site in Seville, Spain. The order is believed to have been placed in May 2014, during the Kadex exhibition in Kazakhstan. A delegation from Uzbekistan visited Airbus's Getafe site near Madrid three months earlier to see the C295, local sources reported, at which point a selection may have been made.

Flightglobal's Ascend Fleets database shows that Tashkent has four Antonov An-26 transports.

Its new transport's emergence follows on from a separate deal announced during the Paris air show earlier in June, under which Saudi Arabia's interior ministry also ordered four winglet-equipped C295Ws. ■





**LRS-B battles nuclear funding threat**  
**DEFENCE P19**

The Global Hawk could carry up to 544kg of sensors



**MODIFICATION** JAMES DREW WASHINGTON DC

## Global Hawk's sensor worth

In-development "payload adaptor" could enable RQ-4B to take on formerly manned tasks

**N**orthrop Grumman's RQ-4B Global Hawk unmanned air vehicle could evolve into a "reconfigurable sensor-transporter" capable of carrying a variety of payloads weighing up to 544kg (1,200lb) under a modification programme currently being assessed by the US Air Force.

The service has concluded that by making various hardware and software changes and adding 17 payload-attachment fittings to the fuselage floor, the Global Hawk could carry additional surveillance and reconnaissance sensors, including those currently flown on the manned Lockheed Martin U-2 Dragon Lady.

"It is feasible to adapt the U-2's Senior Year Electro-Optical Reconnaissance System-2B/C (SYERS-2B/C) and the Optical

Bar Camera (OBC) onto the RQ-4B," the air force says in a recent report to Congress. "The study also shows that it is feasible to adapt the more modern alternative to SYERS, the MS-177, onto the RQ-4B."

### ONGOING DEBATE

The United Technologies-built sensors are at the centre of a long-running debate over whether to retire the U-2 or Global Hawk to cut costs, or keep both. Northrop has long said that with some modifications and the installation of a "universal payload adaptor", the unmanned aircraft can carry and operate the sensors just as effectively as the manned alternative.

Despite reports to the contrary, the air force says there should be

"negligible differences" in the performance of the sensors aboard the Global Hawk compared with the U-2, and likewise for the MS-177 that is carried on the Northrop E-8C Joint Surveillance Target Attack Radar System.

In 2013, the service estimated it would cost \$487 million and take five years to modify its Block 30 Global Hawk fleet to carry OBC and SYERS, but Northrop has since offered to modify six airframes for \$48 million. A second report containing the latest cost and schedule estimates is due out shortly.

The air force has not decided whether it will pursue the modification, but Northrop has asked for government-furnished sensors to demonstrate its payload adaptor design. ■

**UNMANNED SYSTEMS**  
BETH STEVENSON LONDON

## Crowd-funding sought for new Ukrainian UAV

**A** crowd-funding campaign to bring an indigenous Ukrainian military unmanned air vehicle into operation to monitor "enemy movement and locations" is nearing its target.

Through the People's Project site – a venture that aims to provide support to Ukrainian armed forces in times of political and military crisis – the "First People's UAV Complex" project has been established. It is raising money for what it has dubbed the "People's Drone" – or PD-1.

It has set a target of 764,870 Ukrainian hryvnya (UAH) (\$36,400), and had, by 1 July, raised almost 85% of the total.

"Our system is designed so the UAV, in the case of signal jamming, goes into a completely autonomous flight mode and returns to base on its own," the campaign says.

It is fitted with an inertial navigation system, which uses built-in position sensors to track the direction of the aircraft and its current location relative to its start point.

PD-1 features a gimballed gyro-stabilised electro-optical and infrared zoom payload that is designed to be able to transmit and record video. It has an endurance of some 5h. A first flight was performed in March 2015. ■

**DELIVERY** GREG WALDRON SINGAPORE

## Initial RAAF Spartan arrives to succeed Caribous

**T**he first of 10 Alenia Aermacchi C-27J Spartan tactical transports for the Royal Australian Air Force (RAAF) has arrived at its initial operating base.

Aircraft A34-001 arrived at RAAF base Richmond in New South Wales on 25 June. This will be the type's temporary home until its permanent location at Amberley in Queensland is complete.

In May 2012, Australia placed an order for 10 C-27Js through the

foreign military sales programme. Initial operational capability for the type is planned for late 2016 with full operational capability envisaged some two years later.

The RAAF's second, third, and fourth examples are in Waco, Texas, where L-3 converts green aircraft to the Joint Cargo Aircraft configuration and conducts crew and maintenance training.

The work takes three months, and involves the fitting of an elec-



The fleet will comprise 10 C-27Js

tronic warfare and infrared countermeasures suite, US-standard communications equipment and ballistic protection around the

cockpit and loadmaster's station.

The C-27J – to be operated by the RAAF's 35 Sqn – succeeds the de Havilland Canada DHC-4 Caribou aircraft under the nation's Air 8000 Phase 2 requirement. Although popular with the RAAF, the obsolescent Caribou was retired in 2009.

One concern with the Caribou had been its inability to operate in all but the most permissible airspace. ■

# COMMERCIAL FLIGHT SAFETY

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Senior VP Flight Operations, **AirBaltic**



**Mike Anderson**  
Senior Director of Safety, **Spirit Airlines**



**Captain Ian Holder**  
Operations Safety Manager, **Flybe**



**Robin Zammit**  
Head of Safety & Compliance, **Air Malta**



**Rob Hunter**  
Head of Safety & Security, **BALPA**



**Martin Timmons**  
Deputy Director of Safety & Security / Safety Manager  
**Ryanair**



**Gerhard Coetzee**  
Senior Vice President Corporate Safety and Quality Assurance, **Air Astana**



**Walter Schwyzer**  
Captain, **Gulf Air**



**Juan Carlos Lozano**  
Safety Management Expert  
**European Cockpit Association (ECA)**



## FLIGHT SAFETY SYMPOSIUM 2015

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Relationships hold  
the key for Rafael  
INTERVIEW P20

BUDGETS JAMES DREW WASHINGTON DC

# LRS-B battles nuclear funding threat

Pentagon warns it faces “stark choice” over modernisation priorities without \$18 billion-a-year budget boost post-2021

The greatest threat to the US Air Force’s long-range strike bomber (LRS-B) programme could be a submarine, with a new report showing that modernisation of the sea-based leg of the nation’s nuclear triad dwarfs planned spending on airborne assets.

At a congressional hearing on 25 June, US deputy secretary of defense Robert Work said the Pentagon will need an average of \$18 billion per year between 2021 and 2035 on top of what it already spends on the nuclear force, just to afford its planned submarine, bomber, intercontinental ballistic missile and cruise missile replacement efforts.

Without more money for nuclear modernisation, the Department of Defense will be forced to make “very, very hard choices” that would impact conventional weaponry, he says.

“The choice right now is modernising or losing deterrent capability in the 2020s and 2030s. That’s the stark choice we’re faced with,” Work says, noting that the current nuclear force – which has been in place since the Cold War – is “ageing out”.

## TWIN PEAKS

Work agrees with an analysis published on 23 June by the Center for Strategic and Budgetary Assessment, which shows an almost doubling of spending on the maritime nuclear force in the mid-2020s; just as LRS-B production and spending will also peak.

The US Navy will spend upwards of \$10 billion on research and development and long-lead parts for its Ohio-class submarine replacement programme until



US Air Force

The USAF says the government acquired too few B-2s – and cannot afford to repeat the mistake

2020, with this to climb much higher once production of 14 new boats starts from 2021.

USAF plans call for the conventional- and nuclear-capable LRS-B to augment its decades-old bomber force. The service currently owns 70% of the nuclear mission, and has the most to gain from extra spending on modernisation.

**“As a nation we have always found a way to provide what we need for our defence”**

**ROBERT WORK**

US deputy secretary of defense

In written testimony on 25 June, the head of the service’s bomber force, Maj Gen Richard Clark, said LRS-B is due to become operational in the mid-2020s.

He says it is “imperative” that the government buys bombers in

sufficient quantities to ensure an adequate number of aircraft are available in a contingency, and to avoid a repeat of the Northrop Grumman B-2 acquisition, where there are just 20 aircraft and not enough spare parts.

“Many manufacturers do not see a strong business case in supplying parts for a small aircraft fleet,” Clark notes. “Shortages of a single part can have a tremendous readiness impact on a small fleet that lacks the flexibility of a large force to absorb parts shortages and logistics delays.”

Clark also urges that the USAF’s 1980s-era air-launched cruise missile must be replaced by a new long-range standoff (LRSO) cruise missile, or else “capability gaps” will go unfilled.

The USAF is expected to select a bomber team this summer; either a Boeing-Lockheed Martin partnership or Northrop. The service wants to acquire between 80 and 100 examples, at a cost of almost \$600 million

each in today’s dollars.

Work says the order of delivery is first the submarine, then the bomber and LRSO weapon, in addition to the B61-12 nuclear bomb’s integration with the Lockheed F-35.

## PRESSING NEED

Discussions about modernising the US nuclear force have been spurred by the posturing of Russia, as well as China’s increased investment. “They are undergoing a wide-ranging modernisation of their entire nuclear force,” Work says of the nations.

One solution to the looming fiscal hump is the creation of a “strategic deterrent fund”, for which Congress has approved legislation as part of its fiscal year 2016 spending bill.

“As a nation we have always found a way to provide what we need for our defence,” says Work. “We need to start thinking about how to solve this particular challenge together.” ■

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STRATEGY ARIE EGOZI TEL AVIV

# Relationships hold the key for Rafael

Israeli state-owned defence firm wants to replicate sales success of its Litening pod through new international ventures

When Rafael managed to develop the Iron Dome anti-rocket system for Israel in less than three years, those in the know were not surprised. After all, the state-owned defence company has through the years become a leading provider of other such advanced and innovative systems across all domains – including underwater – and is now even in space.

Rafael is today best known for air-to-air missile products such as its Derby and Python families, and also for delivering special payloads for fighter aircraft, but it has developed many other systems to support almost every operational use in the air, on the ground and at sea.

But when many of the technologies Rafael provides are developed purely for domestic consumption, there comes the question of its position on the wider stage and participation in events like the recent Paris air show.

“In spite of our utmost obligation to give the Israeli defence forces the special edge in any defence challenge or threat, we have a big variety of systems and technologies that in some cases are by any aspect leading in the world,” Rafael chairman Yitzhak Gat said in the run-up to the aerospace industry’s main event of the year. “During the air show we have an opportunity to present our capabilities to potential clients, and in many cases that gives them new ideas of what is the best solution for many operational problems.”

## SMART THINKING

One of the best examples of combining capabilities and technologies is Rafael’s Litening targeting pod – which is also being manufactured for the US market with Northrop Grumman – alongside advanced weapons systems. As such, the latest iteration of Litening can “talk” directly to Rafael’s Spice 250 smart bomb – a capability the company says allows



Company is looking for partners in other markets, says Gat

operators to reduce the “sensor-to-shooter” time and significantly enhance the firepower of their combat aircraft.

“We want to show that there is no point in a new technology if it doesn’t know how to work in perfect harmony with others,” says Gat – whose experience includes several senior positions within the Israeli air force. “Warfare today is so complicated that it needs very advanced combinations like this.”

The company’s long-standing co-operation with Northrop on the Litening series of pods, as well as that with another US prime contractor – Raytheon – in the missile sector have proven successful and Gat’s view on pursuing further such relationships is clear.

“Rafael implements the corpo-

rate culture of forming partnerships in Israel and worldwide, with leading governments, aerospace and defence companies. These will bring strength and

**“There is no point in a new technology if it doesn’t know how to work in perfect harmony with others”**

**YITZHAK GAT**  
Chairman, Rafael

leverage to Rafael’s technical know-how. We want to create such joint ventures in other potential markets.”

New Delhi’s investment in defence technologies provides one of the clearest opportunities, he says.

“India has created incentives to form such a joint company with local partners, BEL for example, for manufacturing our Spike missiles as a locally made system,” he adds.

Another potential opportunity exists with the same nation, to potentially supply Litening pods for its planned air force fleet of at least 36 Dassault Rafales.

“This pod is already in service with the Indian air force, and I can assume that they might require to equip the new fighter with it,” he notes.

The global stage presents many opportunities, but is a tough place in which to compete.

## DOMESTIC RIVALRY

“Some international processes and mainly the end of the American involvement in Afghanistan created a new situation,” he says. “We already see a decrease in new contracts worldwide. At the same time the competition has increased dramatically.”

But as much as Rafael is looking to broaden its role on the international stage, the company must also operate within what is a fiercely competitive market involving Israel’s own aerospace and defence companies – an environment which has seen some very negative records set over the years. Despite this reality, Gat believes there are potential opportunities to address this harmful situation.

“I think that the consolidation of companies – like the one that happened in Europe – can be a first positive step. There is no point in a situation that in such a small country some companies will [all] work on the same main technologies.” However, as the domestic competition situation has been allowed to remain untouched for many years, he adds: “At the same time I will be very happy to co-operate with other Israeli companies. Such co-operation exists, but it should be expanded.” ■





Lisa seeking clear water to finish Akoya test campaign  
GENERAL AVIATION P23

Service entry for the Mach 1.6 jet is scheduled for 2020



DEVELOPMENT KATE SARSFIELD LONDON

## Spike updates its S-512 to improve flight performance

Modified delta wing and changes to tail structure cut drag and weight from supersonic aircraft

US start-up Spike Aerospace has modified the design of its S-512 supersonic business jet (SBJ), as the programme advances from the conceptual stage to the preliminary design phase.

"Since the [original] rendering was unveiled in 2013, our engineers have been focused on aerodynamic analysis and design optimisation to meet three requirements: safety, performance and cost-effectiveness," says the Massachusetts-based company.

The most noticeable change to the S-512's design is the modified delta wing which, according to Spike's senior engineer, Anutosh Moitra, "will deliver high aerodynamic efficiency and improved flight performance in

both low-speed flight and supersonic cruise".

The wing's highly swept leading edge reduces wave drag and consequently reduces fuel burn and increases range, he says.

Spike has also modified the aft fuselage, losing the V-tail in favour of a single vertical stabiliser.

"Improved stability characteristics of the new S-512 design allowed us to eliminate the horizontal tail, resulting in further reduction of drag and weight," Moitra adds.

Further changes to the design and specifications are planned, says Spike, which is targeting 2020 for the S-512's entry into service.

These could include modify-

ing the fuselage to allow area ruling features and replacing the Pratt & Whitney JT8D engines with a more modern turbofan. Aerion had considered the same engines for its original SBJ design, but changed its mind last year after ICAO released Chapter 14 noise regulations that take effect in 2020.

Spike founder and president Vik Kachoria says the 18-passenger aircraft is optimised to travel at a speed of Mach 1.6, primarily over the Atlantic and Pacific oceans, from New York to London and from Los Angeles to Tokyo. By 2025, he predicts, there will be 600 to 1,000 supersonic flights a day along these routes. ■

PROGRAMME  
KATE SARSFIELD LONDON

## Discovery has sights set on 201 approval

Discovery Aviation is hoping to secure US certification for its model 201 piston twin before the end of the year, when it will begin asking customers to convert their options into firm orders.

The high-wing type is a modernised version of the 18-year-old Russian-designed Avia Accord 201, equipped with a Garmin G500 glass cockpit and 210hp (156kW) Continental Motors IO-360ES7 engines.

"Flight testing is done," says Discovery founder and chief executive Rick Cunliffe. "Seat crash testing is all that remains – we should complete this within 60 days."

Cunliffe says a lot of the demand for the \$1 million 201 has come from charter operators in remote regions of the world, notably in Alaska and Canada.

"The aircraft is designed for short-field capability," he says. "It can also be equipped with skis and retractable floats, allowing it to operate from snow and water. This broadens its appeal hugely."

The seven-seat 201 is a replacement for rugged piston-twin designs such as the de Havilland Canada DHC-2 Beaver, which has been out of production for nearly 40 years. ■

VERY LIGHT JETS KATE SARSFIELD LONDON

## Eclipse introduces SE upgrade for older EA500s

One Aviation is upgrading its unsold fleet of low-time Eclipse EA500s and Total Eclipse very light jets with the same features as the new-generation EA550. The move should help the airframer to shift the inventory of older models from its base in Albuquerque, New Mexico.

The Total Eclipse was introduced by Eclipse Aerospace in 2010, following its acquisition of the former Eclipse Aviation. This sale included a fleet of around 20 unfinished or low-time

EA500s that were subsequently upgraded with a new cockpit, anti-icing protection and then given the Total Eclipse moniker.

This fleet, along with a handful of more recent low-hour EA500s, have now been rebranded as the Special Edition. Priced at \$2.2

million, this latest version features the dual Avio integrated flight management system, an anti-skid braking system, a newly designed pilot-side standby display unit, a new interior, a "deluxe" two-tone paint scheme, plus a three-year warranty.

"The Eclipse SE is much more than an upgraded Eclipse EA500; it is a factory-supported, like-new aircraft for a very reasonable price," says Eclipse/Kestrel Aviation joint venture One Aviation. ■



The latest Eclipse model is "a factory-supported, like-new aircraft"

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Soyuz deal and a weak euro give Arianespace lift  
**SPACEFLIGHT P24**



One Akoya prototype has notched up more than 150 flying hours from Lac du Bourget in France

**AMPHIBIAN** KATE SARSFIELD LONDON

## Lisa seeking clear water to finish Akoya test campaign

French manufacturer aiming to move from its current base in order to speed certification

**L**isa Airplanes, developer of the Akoya amphibian, is planning to relocate its flight-test campaign for the light sport aircraft, and has narrowed its choice to three possible sites.

The decision has been prompted by limited access to the lake adjacent to Akoya's current flight-test base at Le Bourget-du-Lac, southeast France, which is hampering its certification effort.

"For several months of the year the lake is closed to us – including now – as it is used by the public for various watersports," says Lisa's marketing manager, Vanessa Troillard.

While she is remaining tight-lipped on the location of the proposed sites, Troillard says any

new base will give the Akoya flight-test team unrestricted year-round access to the water.

To date, Lisa has notched up more than 150 flying hours on the first of two Akoya test aircraft. One more prototype is planned.

The privately owned company has earmarked 2016 for certification of the €300,000 (\$379,000), Rotax 912-powered model.

"Once testing is under way at the new base, we aim to get [2008 American Society for Testing and Materials] approval within 18 to 24 months," she adds. European S-LSA certification will follow.

Lisa has secured around 100 deposits for the type to date, with the majority of demand so far coming from North America.

"The USA will be the largest market for the Akoya," Troillard says. "However, we expect a lot of sales to come from Asia – particularly China – where the market for recreational GA aircraft is really opening up now."

Lisa is owned by a Chinese investor, which could ease its foray into the country.

The private owner acquired the company in 2013, after the financial crisis forced Lisa into receivership.

Troillard says the nine-year-old company is now fully funded and other projects are in the pipeline.

"We are looking at other, larger versions of the Akoya – from a four-seater to 10-seater," she says. ■

**DIESEL AIRCRAFT**  
KATE SARSFIELD LONDON

## Piper on target with Europe's first Archer DX

**P**iper Aircraft has delivered the first European-owned Archer DX to its European Aircraft Sales dealership for Scandinavia and the Baltic States.

The handover to the Danish company comes just over a year after the diesel-fuelled version of the Archer LX piston single was launched, in co-operation with engine manufacturer Continental Motors.

The \$400,000 (€360,000) Archer DX – which received European certification in 2014 – is designed as an alternative to traditional Avgas-fuelled piston-engined aircraft.

Piper president and chief executive Simon Caldecott says that outside North America, this fuel is costly and its availability limited.

"The diesel-powered Archer DX was designed to provide our customers with greater access to more economical and readily available fuel sources," he says. ■

**HELICOPTERS**  
DOMINIC PERRY LONDON

## Schedule stays vague for latest rotary Russians

**R**ussian Helicopters has provided more detail on the progress of its two delayed development programmes, the heavy-class Mi-38 and the medium-weight Ka-62, although there is still no clarity on when either will enter service.

The manufacturer says it has begun assembly of an initial "pilot batch" of Mi-38s to a serial production standard at its Kazan facility. However, flight trials using three of four prototypes are set to continue, it says.

Meanwhile, first flight of the Ka-62 is still believed to be scheduled for later this year, with sources indicating it is due prior to the MAKS air show in August. ■

**SHIPMENTS** KATE SARSFIELD LONDON

## Cirrus reaches SR delivery milestone

**C**irrus Aircraft delivered its 6,000th SR-series piston single in mid-June, 16 years after the first member of the four-seat aircraft family – the SR20 – entered service.

The all-composite SR20 was the first certificated general aviation

aircraft to be equipped with an emergency parachute – the Cirrus Airframe Parachute System (CAPS) – as standard. This feature is designed to lower the aircraft safely to the ground after a loss of control, structural failure or mid-air collision. Cirrus says

CAPS has helped save the lives of more than 100 people since its introduction.

The SR20 was joined in 2001 by its upgraded and more powerful stablemate, the SR22. The turbocharged SR22T completed the line-up nine years later. ■



DEVELOPMENT GREG WALDRON SINGAPORE

# Soyuz deal and a weak euro give Ariespace lift

Europe's space company has a busy programme of launches under way – and a new vehicle in the pipeline

**F**or European launch operator Ariespace, 2015 has been a landmark year. So far, the company has lofted seven payloads with five launches – two of its heavy-lift Ariane 5, one of the middleweight Soyuz and two of its light launcher Vega, which has now notched up five flawless flights in five attempts – all from its main launch base in French Guiana.

On the commercial front, late June saw Ariespace secure a contract for a massive 21 Soyuz launches from space-based internet provider OneWeb, in a deal that also includes options on Ariane 6 flights (*see facing page*). Development of Ariane 6, meanwhile, continues apace following mid-course approval in December 2014 by European Space Agency member governments, and major shareholders Airbus and Safran are making headway on the complex task of jointly consolidating control of the Ariane industrial programme.

To add a bit more lift, the euro's weakness has also given the launch company a strong pricing boost in the increasingly competitive market for satellite launch deals.

"The low euro allows a return to fair competition," says chief executive Stéphane Israël. "Now we think the euro/dollar is more balanced, and this gives us more flexibility in our pricing policy and a strong competitive advantage."

Israël spoke with *Flight International* in Singapore at the recent Communicasia event, a focal point of the fast-growing Asia-Pacific market for satellites and launch services. The interview came almost exactly one year after it was announced that two key shareholders, Airbus Group and Safran, would create a joint venture to streamline the European launch industry – a move spurred in large part by the emergence of SpaceX, which markets Falcon 9 flights at as little as half the price of an Ariane 5 lift.

## SHARE SALE

Now, Airbus Safran Launchers is the largest shareholder in Ariespace, with a 39% stake. In the last year the joint venture has grown to 400 employees, and in the future it will grow to 8,000, says Israël.

He adds that talks continue with the French government about French space agency CNES's 34.7% stake in Ariespace – although he declines to provide further details. If a deal is concluded, the joint venture will hold more than 70% of Ariespace's shares.

Israël stresses that the primary goal of the changes is to give industry far more responsibility for Ariane 6 than in the Ariane 5 programme. "Airbus Safran will have the responsibility of the design of the rocket," he says. "Today this sits with CNES. Moreover, there will be stronger ties between Ariespace and industry for Ariane 6."



The company's rockets have been launched five times in 2015

"If industry becomes the primary shareholder of Ariespace, then for sure Ariespace will be closer to the Airbus Safran joint venture, because it will represent a new order."

Ariane 6 will have similar payload characteristics to the Ariane 5, and will be capable of putting a payload of 10.5t in geostationary transfer orbit (GTO). There are, however, important differences. Critically, Ariane 6 will be a modular system and come in two versions: Ariane 62 and Ariane 64, with two and four strap-on solid rocket boosters respectively, around a liquid-fuel main stage and a new, re-ignitable upper stage. The 62 is optimised for putting smaller satellites into low-Earth orbit, while the 64 is optimised for taking commercial satellites farther up into GTO.

Another key difference is the re-ignitable upper stage – the Ariane 5's upper stage can be fired only once.

"The re-ignitable engine allows for more complex missions than we perform today," says Israël. "The main stage will not be very different. It will have the same engine, but we will optimise it to reduce costs."

While SpaceX is trumpeting its

(so-far unsuccessful) bid for main stage reusability, Ariane 6 will not have a reusable main stage – although Airbus is working on a plan to recover and reuse the main stage engine.

"Ariane 6 will not be reusable, but it is open to such an evolution if necessary," says Israël. "The question of reusability is not a question of technology, it is a problem of the business case."

## PERFORMANCE

A reusable main stage compromises performance: some of the rocket's capability is dedicated to returning a portion of the payload to earth. "With Ariane 5 we use all our performance getting to space," says Israël. "We are not in a position to lose 30% performance for the sake of reusability."

Moreover, the refurbishment of the used main stage can be costly, and customers may not be willing to mount a valuable satellite on a main stage that has already flown. Finally, Israël says that Ariespace's market is not calling for this feature: "We have spoken to customers, and they have said that, whatever competitors do with reusability, Ariespace should go straight to Ariane 6 in 2020." ■



Airbus Safran Launchers has a 39% stake in Ariespace





Clearer skies?  
FEATURE P26

DEVELOPMENT DAN THISELL LONDON & LONG BEACH, CALIFORNIA

# Virgin focuses on unmanned mission

With space tourism grounded, Richard Branson's company is thrusting ahead with air-launched rockets for satellites

Virgin Galactic could be excused for looking a bit glum these days, with its suborbital tourism programme years behind schedule and grounded since a fatal crash last October. But while its dream of personal spaceflight may be on hold, its satellite-launching venture is bounding ahead.

Indeed, the highest-flying operation in Richard Branson's Virgin Group empire is suddenly at the centre of one of the most ambitious – if not audacious – schemes in the history of commercial spaceflight. The first signed customer for LauncherOne, an air-launched rocket that will fly from the same carrier aircraft as the passenger-carrying SpaceShipTwo, is OneWeb, a UK-centred company preparing to orbit 900 – yes, 900 – small communications satellites to bring affordable broadband to anywhere on the planet.

As detailed at London's Royal Institution on 25 June, OneWeb's grand plan, so far backed by \$500 million and with another round of fundraising to come, will not rely exclusively on Virgin Galactic. But to orbit the bulk of its constellation between 2017 and 2019 it has contracted for no fewer than 39 LauncherOne flights, with 100 options, to supplement 65 Soyuz flights from Arianespace to do the heavy lifting.

## “TRANSFORMATIVE” MOVE

The satellites are being developed by Airbus Defence & Space. The first 10 will be built in Toulouse and the rest will come out of a facility to be established in the USA. The scale of the venture is not lost on Airbus Group chief executive Tom Enders, who at the London presentation described a “transformative” move from producing maybe a dozen satellites yearly to 300-400: “Building these satellites is a project of the new space age.”

Virgin Galactic's role in the deployment is supplemental but

critical. Depending on the size of the satellites – less than 150kg (330lb), but they may shrink further as development continues – each Soyuz will be able to lift about 36 to low-Earth orbit, while a LauncherOne rocket will handle one to three.

Virgin Galactic chief executive George Whitesides tells *Flight International* that LauncherOne may do some of the initial deployment – OneWeb wants to get some spacecraft into orbit in 2017 and Soyuz flights won't start until 2018 – but rapid response is the key: “What we'll shine at is replenishment, to fill gaps whenever necessary.” OneWeb founder Greg Wyler says he needs to be able to replace a faulty unit within 24h.

That rapid response underpins LauncherOne's appeal. Virgin Galactic is working to a \$10 million launch cost, which at first glance does not look like good value for OneWeb. Arianespace is understood to charge about €64 million (\$71 million) for a Soyuz flight from Kourou and €40 million from Baikonur, but to orbit the 36 satellites packed on to one rocket would cost up to \$360 million with Virgin Galactic.

But that \$10 million price



Trusted: the Newton engine

point is significant. LauncherOne is being designed to lift up to 225kg to a low-inclination, low Earth orbit or 120kg to a high-altitude Sun-Synchronous orbit, both of which are valuable for Earth observation to small operators and scientific missions. These are just the sort of missions that struggle to get to space, as to afford launch they must typically go as secondary, “piggyback”, payloads and thus are beholden to the long lead times and delays that characterise traditional launches.

Will Pomerantz, Virgin Galactic's vice-president for special projects, says the 225kg target is a “good middle point” for these customers. Soyuz, he says, offers the best dollar-per-kilo package, but Virgin Galactic's appeal will be on “absolute cost”, as well as flexibility and speed, both of which are strengths of air-launch.

When *Flight International* visited the Long Beach, California site in May, the factory floor was a still-mostly-empty 150,000ft<sup>2</sup>, (13,900m<sup>2</sup>) which Virgin Galactic had taken possession of a couple of months earlier. Pomerantz, who joined the company four years ago from the X-Prize Foundation, describes the operation as “relatively vertically integrated”, including “tip to tail” design of the rocket.

Until the Long Beach site is equipped, testing and manufacturing is happening at Virgin Galactic's facility in Mojave. The programme is pushing for a first flight in the next 18-24 months, which could coincide nicely with OneWeb's early deployment schedule.

## JOBS FAIR

Meanwhile, momentum is clearly building in Long Beach. A recent jobs fair offering 100 manufacturing positions attracted more than 6,000 visitors – perhaps no surprise, given the area's long history in aerospace and the imminent shut-down of Boeing's nearby C-17 plant.

Upstairs in the design department, Pomerantz already has 80 engineers at work, representing expertise from every US rocket programme. LauncherOne's Newton engines are a tried-and-true two-stage liquid oxygen-kerosene design – Virgin Galactic, says Pomerantz, wants to “walk before it runs” with more exotic motors.

But those engineers are meeting every day to discuss rocket size and cost, looking for “wiggle room” to offer a bit more payload capacity while learning the needs of an evolving market. Critically, he says, Virgin Galactic is not a government-funded research and development operation with a set goal, it isn't building rockets to a business plan and will not be reliant on any single customer.

The goal, he says, is not to build a better rocket. “It's to build a better launch service.” ■



LauncherOne will be able to lift up to 225kg to low Earth orbit



# CLEARER SKIES?

Transforming a 28-nation air traffic management network into a “single European sky” promises vast rewards in efficiency but is a mammoth project marked by steady rather than spectacular progress

DAVID LEARMOUNT LONDON

Europe’s Single European Sky ATM Research (SESAR) project, according to its latest self-assessed progress report, “is proving to be a powerful catalyst in transforming Europe’s ATM network into a modern, cohesive and performance-based operational system.”

That might be news to airlines that operate in certain parts of the continent’s still-fragmented airspace, but some advances – such as better-managed arrivals at busy hub airports – are becoming visible in other areas.

Industry sceptics, meanwhile, are worried that the complexity of the technology and the difficulty of achieving the unifying objectives of SESAR projects among so many national air navigation service providers (ANSP) could cause the project to lose its way.

Arnaud Feist, president of the Airports Council Europe, reminds SESAR’s leaders what the project is all about. He says predictability is what passengers want, and the keys

are collaborative decision-making and fully interoperable systems. The airlines, in the words of Association of European Airlines chief executive Athar Husain Khan, say interoperability in Europe and globally is essential, because only a seamless system will deliver the efficiencies enabling carriers to operate predictably and at low cost.

## KEY OBJECTIVES

The European ATM Master Plan lays out key objectives, and it is against these that progress can be judged. They are: achieving traffic synchronisation, particularly in manoeuvring areas at busy terminals; ensuring airport integration into the total ATM system, and accelerating airport throughput; moving from passive airspace management to active four-dimensional (4D) trajectory management (three dimensions plus time); network collaborative management with demand and capacity balancing; conflict management and automation; and a system-wide information management (SWIM) network as the enabler for all of it.





**Heathrow: 1,290 arrivals or departures daily**

which 15 separate system validations were carried out in 68 local exercises. That process continues today.

### HAIL, SESAR

The SESAR deployment phase that follows all the development and validation work will consist of a series of “Pilot Common Projects” managed by the recently established SESAR Deployment Manager. The manager directs an alliance of European ATM participants in partnership with the EC “...who will ensure that new technologies and solutions that have already been tested and validated through the SESAR joint undertaking are delivered into everyday operations across Europe”. These are so-called “SESAR solutions”, the successful operation of which in several locations will – hopefully – lead to adoption throughout the still-nationally-minded network.

A scan of significant sites throughout Europe – airports and bases where the new solutions are being implemented or trialled – shows that the system being implemented at more sites than any other is the initial version of the SWIM system. This is encouraging, because when fully implemented SWIM will be the neurological network for the whole Single European Sky. It enables network-wide collaborative decision-making that responds in

real time to demand. Like a healthy body’s nervous system, SWIM should make the entire system react intelligently and responsively. As Eurocontrol’s ATM director, Philippe Merlo, says: “All ATM activities depend on information management.” This prime objective is recognised at International Civil Aviation Organisation level.

But every technology-dependent system fundamental, such as SWIM, also has human-related or culturally related layers. Even in a brilliant digital datalink network receiving comprehensive information from all relevant sources, a standardised form of information presentation has to be agreed or it will not work. That is a major task in its own right.

SESAR involves so many parallel streams of activity during the present deployment phase that there is a need to maintain a wide-angle view of ATM advances. For example, all approved advances must adhere to agreed principles ensuring global interoperability,

### “All ATM activities depend on information management”

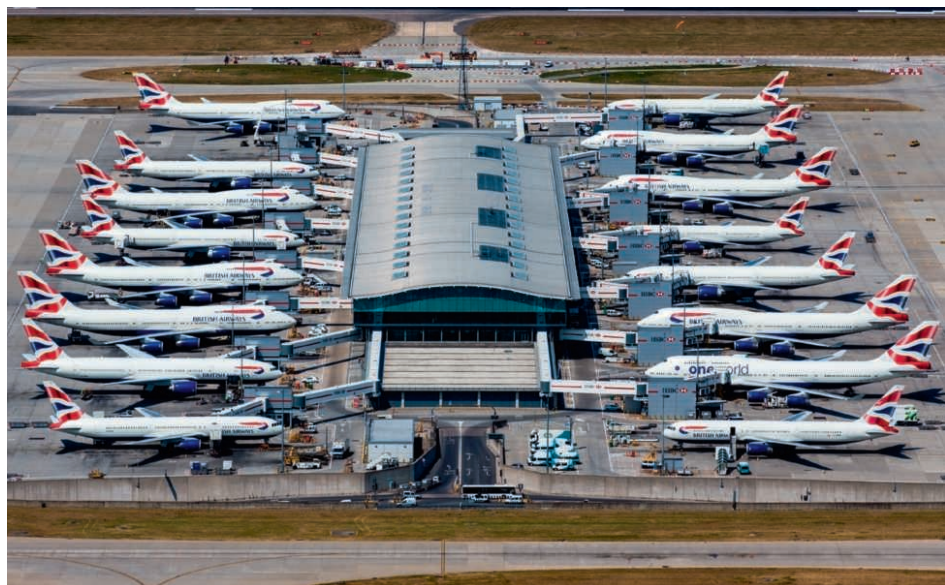
**PHILIPPE MERLO**

ATM director, Eurocontrol

and research and development must be synchronised to ensure progress meets that objective. New solutions applied locally must be seen to adhere to agreed standards. The latter concern acknowledges that the national fragmentation that still bedevils the implementation of SESAR plans might still allow for individual operational interpretations of new procedures. So standard operating procedures must be not only applied, but also centrally overseen.

The integration of airports into the total ATM system entails bringing the time between an aircraft landing and taking off again into the ATM equation, which previously was not considered an ATM issue. Part of this objective is to enable airports to process more traffic – Europe has a serious problem with capacity, especially at its major hub airports – but the other part is to integrate landing slots and take-off slots with planned 4D trajectories. A change in mindset a few years ago led to ATM planners talking about a total aircraft working cycle as being from cruise to cruise, rather than from take-off to landing. More sophisticated aircraft ground movement control systems are just part of this.

The growing effectiveness of SESAR research, according to its leadership, is demonstrated by the European Commission’s decision to execute the first set of SESAR solutions that are considered mature enough for synchronised deployment across Europe in 2015-2020. This is the product of ground-work carried out between 2011 and 2014, in



**Even small reductions in flight times could have a big effect on the performance of large airlines**



» Then there is the global perspective. The USA is implementing its NextGen ATM system, facing the same technological challenges but without the cultural, linguistic and geographical fragmentation. Between them, the systems that Europe and the USA create will be templates for the rest of the world, so the pressure to make them effective and interoperable is huge. There is a transatlantic memorandum of cooperation, and at present – despite a couple of exceptions yet to be resolved – harmonisation seems to be proceeding well. ICAO, as the touchstone for global standardisation, provides guidance on common standards and objectives.

#### METEOROLOGICAL DATA

And there are things each side can learn from the other. America, for example, is more advanced in the dissemination of real-time meteorological data among centres and to aircraft, and is ahead on the implementation of required navigation performance/GPS-based approaches and departures. Meanwhile Europe wants the USA to accept the ED-133 standard on flight trajectory data sharing that defines the interface between different civilian ATC Flight Data Processing Systems, but this is still under discussion, according to Merlo.

Merlo says one of Europe's objectives is to implement more performance-based navigation systems, as in America and many other countries. Some have been implemented in Europe, but based only on local initiatives, usually related to difficult terrain in the vicinity of specific airports, such as small airfields in Norway or the Faroe Islands. GPS-based required navigation performance (RNP) allows curved approaches, essential where

close surrounding terrain is a problem, and is potentially advantageous in congested and complex terminal manoeuvring areas.

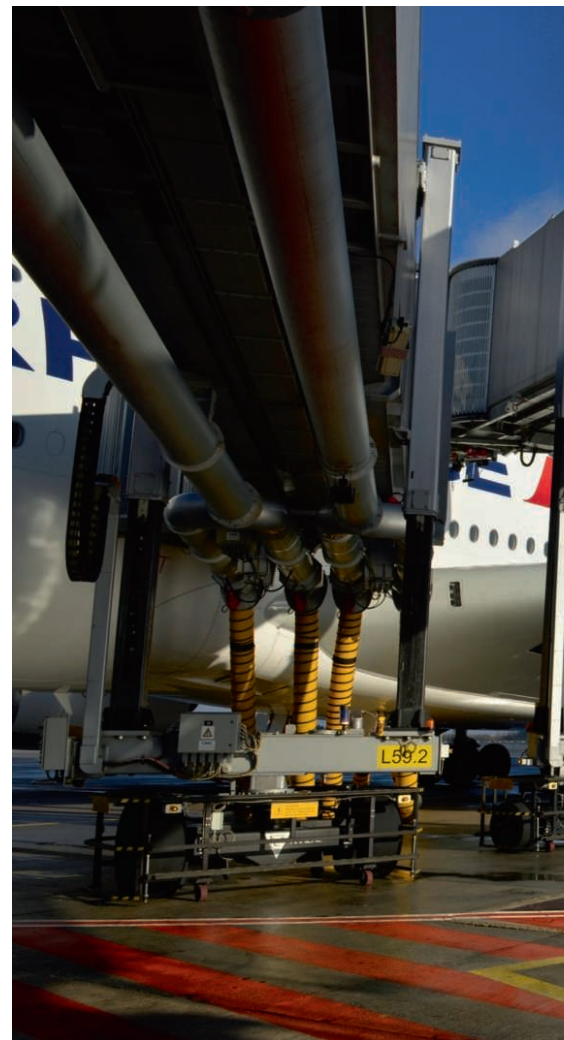
Merlo adds that the European Aviation Safety Agency is working on standards for European RNP, which will help things progress. RNP airfield approaches, perhaps linked into

### Systems that Europe and the USA create will be templates for the rest of the world

instrument landing systems (ILS) or augmented GPS runway approaches, have the potential to deliver more approaches and departure trajectories into a given piece of airspace, Merlo points out. This can improve capacity as well as safety, he observes, but where airports are surrounded by urban residential development, changes in approach and departure procedures are highly contentious. In crowded Europe, this is perhaps the principal reason for the region's laggardly performance in the implementation of RNP, but the other factor is the ubiquity of traditional terminal navigation systems such as ILS. By contrast, the areas of the world where GPS-based RNP has been adopted fastest are those where no traditional precision navigation aids exist.

In December last year, the movers and shakers in SESAR, Eurocontrol and the EC met in Brussels at a "high-level meeting". Its purpose was to review the progress of the European ATM Master Plan. According to Merlo, it was more of a reaffirmation than a reorganisation.

However, Merlo says there is much more going on than the application of technology.



There is, he says, a growing determination that the business objectives of the exercise must be delivered. That means low cost and efficiency, not just clever systems. In fact, he says, the priorities for system deployment are now determined according to those that will deliver the best cost/benefit.

He acknowledges that the economic downturn since 2008 has given SESAR's deployment programme a break. Before the recession, priorities were all about a scramble to develop the capacity to cope with rapidly increasing traffic. Since that increase did not happen, the priorities shifted in the direction of cost-efficiency and the need to support the struggling airlines. Now, Merlo says, gentle growth has returned, and a 1-2% traffic increase is expected this year.

The cost/benefit delivery plan has two dimensions, explains Merlo. The first is the delivery of operational improvements that reduce distances flown between all departures and destinations, and therefore reduce fuel burn. The second involves reducing the cost of delivering ATM, which means making the ANSPs more efficient on a network-wide and an individual basis.



One objective is to synchronise traffic, particularly in manoeuvring areas at busy terminals





As well as cutting flight times, the SESAR project aims to reduce the cost of delivering ATM

Merlo reckons there is a 6% gap between the operational efficiency of the existing system and that of an ideal route network. In realistic terms, he says, about half of that is achievable, but even that 3% improvement could deliver a €1 billion (\$1.1 billion) fuel-saving to the airlines annually. As for bringing down the ANSPs' costs, that could deliver another €200 million in reduced user fees, he says, and one of the keys to this is centralising certain services rather than having all ANSPs performing all ATM and aeronautical information delivery functions themselves.

#### HIGH-LEVEL ATM SKILLS

Merlo accepts that attempts to close area control centres so as to operate with fewer of them has – so far – always failed because national authorities want to keep high-level ATM skills within their borders. He hints, however, that centralising essential total network functions at specialist locations, rather than continuing with the traditional geographically based airspace management system, may be the way to go. However, this requires a mindset change, and there is no sign of that yet, he reckons.

Although Merlo says nobody disputes the benefit of centralising services, it is politically difficult for national governments to deliver such an objective. And to add to the difficulty of delivering centralisation, European rules on competition prevent the allocation of functions on a politically or geographically expedient basis, requiring competitive tendering by would-be providers.

A major obstacle to progress is the technological and investment challenge involved in the ultimate objective of implementing free route airspace enabled by accurate 4D trajectory management for every flight.

The principle of 4D management is that every aircraft in the sky has a target time over area navigation waypoints en route and at destination. At those waypoints, position and height are specified.

All these individual 4D trajectories are coordinated, thus achieving traffic flow management and separation. Merlo points out that the early stages are being trialled now, but he admits that a fully implemented 4D system is technologically hugely challenging and involves considerable investment in system-wide advanced datalink capability, both

### A 3% efficiency improvement could deliver a €1 billion saving to the airlines

on the ground and in aircraft. All the components have been validated in individual flight trials, but the complete systems interoperability and flightplan datalink between ANSPs that is essential for this ambitious objective does not yet exist, says Merlo.

The result is that 4D will take five years longer to achieve than expected. This fact is now accepted and built into the SES plan, but it will affect the achievement of cost-benefit targets, Merlo admits. It will, however, definitely be achieved in the end, he insists.

#### SPEED CONTROLS

In the meantime, he observes, simpler versions of partial 4D trajectory management, such as extended arrival management, are being implemented. An example is the partnership between the UK and French ANSPs to apply speed controls to aircraft well upstream when they are inbound for major hubs such as London Heathrow and Paris Charles de Gaulle. The result is the arriving aircraft can slot straight into an approach, instead of having to be put into a holding pattern – what Merlo calls “rush to wait”. And there are some European areas – such as Scandinavia – where good interoperability and advanced systems exist, so in Scandinavian airspace free routing will begin this October, Merlo reveals.

Essential to a free-routeing environment is a conflict-alert system to help air traffic control officers (ATCOs) manage a dynamic 4D environment. But since – in theory – the network knows the predicted trajectories of all the aircraft, medium-term conflict alerts can be reliably generated by the system. If trajectory change is required, ATCOs can use a “what if” function to test a new tactical instruction before passing it to the aircraft crew. All aspects of the system performance of these functions is being trialled widely: in Southampton, UK; the Maastricht Upper Area Centre, Netherlands; Toulouse, France; Rome, Italy; and Langen, Germany. And of course the final separation safety net – upgraded versions of the traffic alert and collision avoidance system – is installed in all aircraft that operate within controlled airspace.

The roll-out of SESAR solutions for validation – all those objectives covered in this article – has reached what the planners call “Release 5”. For those who cannot recognise progress while peering through the forest of multiple parallel SESAR programmes, the roll-out of Release 5 means that Releases 1 to 4 have been implemented. So SESAR is indeed advancing, just not in a spectacular manner. ■



Faroe Islands' Atlantic Airways is now able to fly in all weathers using satellite-guided approaches

# HOMING IN ON A NEW APPROACH

Successful roll-out of satellite-guided navigation at several remote and challenging airports in Europe may signal broader adoption of the technology soon

DAVID LEARMOUNT VÁGAR

Europe, compared with much of the rest of the world, has been slow to adopt satellite-guided required navigation performance (RNP) airport approach and departure procedures. Where they have been adopted they have been used for airports that cannot employ traditional ground-based aids because close terrain makes the signals from guidance systems such as instrument landing systems (ILS) unusable.

Successful implementation at such airports, however, has satisfied EASA and the increased use of satellite-guided precision area navigation is a part of the Single European Sky air traffic management project.

The reasons why RNP procedures have not been adopted widely in Europe include the fact

that traditional precision aids such as ILS are widely – if not universally – available. Also, despite the fact that there are potential gains to traffic capacity to be had in saturated terminal areas from the use of more flexible curved RNP approaches and departures, permission to use them is difficult to win where the approaches and departures are over built-up areas. They tend to be opposed by residents on environmental and noise abatement grounds.

## ALL WEATHER

Norway's air navigation service provider, Avinor, inaugurated a simple satellite-based approach to Brønnøysund in 2007, so Europe has had plenty of time to see what can be done. But more recently, the Faroe Islands airline Atlantic Airways has been completely transformed from effectively good-weather-only operations to

flights in almost all weathers. Atlantic's decision to go down this path mirrors experience in the USA, where the installation and approval of satellite-guided approaches has increasingly been initiated by airlines, rather than the Federal Aviation Administration.

Atlantic worked with Airbus to create tailored RNP approaches to the islands' one and only airport at Vágar. The precision RNP AR (authorisation required) 0.1 approach ensured reliability for scheduled flights, enabling new routes to become commercially viable, and also converting from a fleet of BAe 146s to operations using the Airbus A320 series.

## HIGH TERRAIN

Now decision heights for landing have been lowered still further by using the curved-approach RNP procedure to feed aircraft into a Category 1 ILS for final approach to runway 30 at Vágar. Atlantic says the decision height now for the Yankee RNP approach into the ILS allows a 220ft decision height in visibility of 800m (2,630ft). The pure RNP Zulu approach to runway 30 has a decision height of 250ft, whereas before the RNP was approved by EASA, pilots had to weave visually around high terrain with decision heights more than three times greater. That meant flights were frequently cancelled or diverted to Iceland, Scotland or Copenhagen. RNP approaches to the reciprocal runway 12 are pure satellite-based; they do not feed into an ILS.

Norway's Brønnøysund approach, designated as SCAT-1 (special category 1) with ground-based local augmentation (GBAS), was installed as steep-sided high terrain directly below the approach would interfere with an ILS signal. It was such a success that Avinor has since installed SCAT-1 approaches at several



Atlantic worked with Airbus to create tailored RNP approaches at Vágar airport



## “The instrument guidance was rock steady – no twitches – and the aircraft was perfectly aligned”

other airfields serving remote communities that would otherwise be cut off in winter.

At the time of its inauguration, *Flight International* witnessed two night SCAT-1 approaches to Brønnøysund's runway 04 from the jump seat of a Widerøe Bombardier Dash 8-100, and this is how it was described on an arrival from Widerøe's main base at Bodo.

“From the pilot's point of view, flying the Avinor SCAT-1 system looks like flying an ILS. The difference is how the approach path is defined. The SCAT-1 system defines a line in space, and the aircraft's position relative to it is tracked both laterally and vertically by GNSS and the Brønnøysund GBAS installation. This invisible path starts at a predetermined height directly above the runway threshold and extends to a range of about 20nm [37km]. At Brønnøysund, the glideslope is 3.9° and the approach azimuth is aligned with the runway at 037°.

“The pilot flying tuned in to the Brønnøysund SCAT-1 approach. Upon acquiring the GNSS signals corrected by the Brønnøysund GBAS, the system annunciator displayed ‘DGPS’ in green, and the pilot followed the same flight instrument guidance he would follow for an ILS to intercept the approach from the left, and began descent on intercepting the glideslope at the final approach fix. The instrument guidance was rock steady – no twitches – and when the runway lights appeared, the aircraft was perfectly aligned.” ■



David Learmount

**NAVIGATION** DAVID LEARMOUNT LONDON

## EUROPE LAGGING, BUT PUSH FOR RNP UNDERWAY

EUROPE MAY be well behind the rest of the world in using required navigation performance (RNP) airspace management solutions in airport terminal areas, but aside from the successful Atlantic Airways project in the Faroe Islands, a few other European RNP projects are under way.

The massive, multi-layered Single European Sky ATM Research (SESAR) Joint Undertaking (SJU) push towards the holy grail of a Single European Sky includes a project called RISE (RNP Implementation Synchronised in Europe). This plan, in partnership with Airbus ProSky, will oversee the implementation of performance-based navigation (PBN) procedures at just eight airports in southern Europe.

In contrast, the US Federal Aviation Administration's NextGen air traffic management modernisation programme has as one of its prime objectives the move towards complete satellite-guided RNP as the primary means of navigation, both en-route and at terminal. Europe, with its denser airspace, is more hesitant.

### TRIALS BEGIN

Meanwhile, the SJU RISE project was launched last December and trials are beginning now. It is managed by Airbus ProSky in collaboration with four air navigation service providers and three airlines: Cyprus's DCAC, NAV Portugal, France's DSNA and Greece's HCAA, working with Air France, Novair and TAP Air Portugal. This will involve more than 160 flight trials, including RNP approaches, RNP standard arrival procedures, visual area navigation (RNAV), and RNP approach to instrument landing system (ILS).

Airports involved include Nice and Ajaccio in France, Paphos and Larnaca in Cyprus, Madeira and Horta in Portugal and Corfu, and Iraklion, Santorini and

Mykonos in Greece. RNP will remove the need for circle-to-land approaches and make ground navigation aids redundant, or at most a back-up. It will also lower weather minima and allow shorter tracks, resulting in track miles savings, as well as facilitating fuel-efficient continuous descent arrivals.

Head of SJU programmes Florian Guillermet comments: “The RISE project offers an important opportunity to demonstrate more widely the significant efficiency, safety and environmental benefits that are possible with PBN procedures. In doing so, the project will further convince the broader community that the first

### “The RISE project offers a chance to demonstrate the benefits of PBN procedures”

SESAR solutions are fit for wider scale implementation.”

Airbus ProSky describes the purpose of PBN procedures using RNP standards as “an important way of freeing aircraft from reliance on ground-based navigational aids, and allowing more flexible and optimum routing using satellite navigation”. The company adds: “While these procedures have existed for some time, implementation in Europe has been slow due to a number of operational factors.”

Meanwhile, across the Atlantic, Airbus ProSky has supported South African Airways in winning the first FAA approval to operate RNP-AR (RNP – authorisation required) procedures in the USA with Airbus A330s, while just to the south, Haiti is preparing to introduce PBN navigation procedures at two of its airports.

The effect of the FAA approval for SAA is that the carrier's

A330s can fly all public RNP-AR procedures in the USA, including the challenging curved approaches into New York's John F Kennedy airport. The aircraft is fully guided by its automatic flight system during RNP-AR approaches. SAA had already worked with Airbus ProSky to become the first operator of RNP-AR procedures on the African continent, so RNP was not new to the carrier.

### SAFETY BOOST

SAA head of flight operations Capt Sandy Bayne says:

“Introducing RNP AR approaches to JFK will make it easier and safer for pilots to operate these challenging approaches on the arrival of our long-haul flights from Johannesburg. It is a great enhancement to our operations in the US, and we are proud to be the first Airbus A330 carrier to receive approval.”

Also, following a meeting in Miami to agree the Haitian RNP programme, Haiti's Office National de L'Aviation Civile, IATA, Airbus ProSky and operators including American Airlines, Air France and Jet Blue have set out to validate the new terminal airspace designs for Cap-Haïtien International airport and Port-au-Prince International airport.

The result will be RNP category 1 standard arrival procedures, standard instrument departures and RNAV global navigation satellite system-guided approaches to both airports. An RNP-AR on runway 05 of Cap-Haïtien airport was also designed to provide shorter trajectory options for operators that are RNP-AR capable, resulting in significant track miles reductions, and thus fuel savings.

Fuel savings, noise nuisance reduction, improved traffic flow through airports and better safety are all achievable via well-designed RNP approaches. Even in Europe they will become the standard, eventually. ■

From yuckspeak to tales of yore, send your offcuts to [murdo.morrison@flightglobal.com](mailto:murdo.morrison@flightglobal.com)

## Tanks for the memories

Top marks to our man in Singapore for spotting the (deliberate?) error in an image released to announce Korea Aerospace Industries' contract to develop a new light armed rotorcraft derived from Airbus Helicopters' aged H155 (right).

Of course the folks in Seoul don't rate North Korea's armed forces too highly (dogfight with a Shenyang F-5, anyone?) – but isn't that a World War II-era Panther tank healthily ablaze?

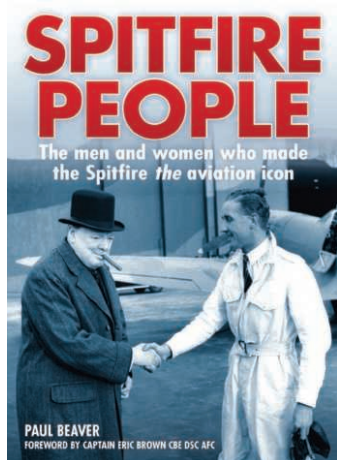
## Mitchell & Co

Staying on a war footing, we bring news of a new tome which is being published to coincide with the 75th anniversary of the Battle of Britain.

If you thought there was nothing more to say about R J Mitchell's finest creation after countless books concerning the Supermarine icon, then you should find the time to read Paul Beaver's *Spitfire People* (Evro Publishing, £25).

Rather than being the sole figure responsible for giving "The Few" the right equipment to repel the Luftwaffe, Beaver contends that Mitchell – who died before the first production Spitfire took to the air – "was the great co-ordinating genius" for a monumental team effort.

His book looks at some of the other major players – whose



Easily satisfied with the very best



Museum piece: and a World War II-era tank also

contributions have been largely overlooked since the conflict – details the political backing vital to delivering the aircraft, and features some of the pilots who became aces at the controls.

An illustrated appendix showing each of the variants produced also gets our seal of approval for "the right stuff".

## A piece of Madeira cake?

Nice video on YouTube of a British Airways Airbus A320 landing at Funchal on Madeira – narrated by the captain.

The somewhat challenging, non-ILS approach involves hugging the coast and checking for landmarks before the runway appears, squeezed between the mountains and the ocean.

BA began flying to the Portuguese-owned Atlantic island, three times a week from London Gatwick, in May.

## Spur Majesty

The Queen is used to keeping her feelings to herself, but she may have had to employ all her skills of self-restraint on her recent state visit to Germany.

No, nothing to do with the Greek crisis or mentioning the wars. Her mode of transport to Berlin was an Embraer Legacy

650, owned by Tottenham chairman Daniel Levy, with the registration G-THFC (Tottenham Hotspur Football Club).

Is that so bad? Only because Her Maj reportedly is a fan of arch rivals Arsenal.

"The Queen follows football and she told us she was an Arsenal fan," then-Gunner Cesc Fabregas revealed to Spanish radio after the Queen met the team at a Buckingham Palace reception a few years ago.

## The first spotter

Saddened to learn of the death aged 93 of Ian Allan, original trainspotter and publisher of many hundreds of aviation, rail, and other transport titles for more than 70 years.

Ian Allan Publishing began with his *ABC of Southern Locomotives* in 1942. He noted later that, in an era when in Europe you could be shot as a spy for recording train details, in Britain railway information remained public knowledge even in wartime. After losing a leg in the Officer Training Corps, Allan worked for the Southern Railway PR department during the war, a job that allowed him to indulge his passion for trains.

His early books are credited with helping launch the very British fashions for both trainspotting and planespotting.

## Dirigible damage

Last night our dirigibles bombarded effectively enemy

**100 YEARS AGO**

encampments in the environs of Doberdo and the Dornberg-Prvacina

Railway Junction, damaging the line and the station of Prvacina. Our airships, which were cannonaded by anti-aircraft guns, returned safely.

## A good luck tail

One aircraft, pressing home its attack through a screen of

**75 YEARS AGO**

bursting shells, was repeatedly hit. "I expected the tail turret to

fall off, but luckily it didn't," remarked the rear gunner.

"The whole of the interior of the fuselage was lit up by the flashes of shells."

## Formidable French

We must analyse the reasons for the success of the French

**50 YEARS AGO**

industry over the last decade. French industry is unique in being

divided into two sectors – three nationalized companies on the one hand and smaller private companies on the other. Both military and civil aircraft are almost always planned with the prospect of export sales in mind.

## Co-operating well

Israel Aircraft Industries (IAI) would fit engines to Soviet

**25 YEARS AGO**

airliners under a plan revealed by Soviet president Mikhail Gorbachev

at the US/USSR Washington summit. "The Soviet Union will build the bodies, the USA will supply the engines and Israel the avionics," he said.

**100-YEAR ARCHIVE**

Every issue of *Flight* from 1909 onwards can be viewed online at [flightglobal.com/archive](http://flightglobal.com/archive)

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### Why not explore every angle?

As the case against Heathrow expansion rests largely on its noise impact on 10 million Londoners, I find myself perplexed as to why Heathrow is not proposing two new runways offset by, say, 20° from the existing, to drastically alter the approach paths away from central London.

This, combined with area navigation curved approaches, would largely eliminate the need for aircraft to constantly fly the same approach paths.

Only in poor weather would the instrument landing system need to be utilised – and then, of course, most windows would be closed and most folk indoors.

**Paul Burch**

Farnham, Surrey, UK

### Boom and bust

Matt Wood (*Flight International*, 30 June-6 July) writes to suggest that a Singapore Airlines A330-300 “modified to receive fuel from a boom” could replenish its tanks “somewhere over the Bay of Bengal” from a Singapore air force A330 MRTT air-to-



It's not just London's flag

#### RUNWAYS

### Notes from a small island

Here we go again – Heathrow expansion, with little thought for the rest of the UK.

We are a small island, with another £147 billion (\$230 billion) and a potential 70,000 jobs almost certainly to be concentrated yet again in the southeast. With that sort of funding stream we ought to be able to build a centrally-placed facility with superfaster surface links, such that the benefits spread throughout the UK, not just – yet again – to London. Tell me why such infrastructure wouldn't make greater sense based – say – on Doncaster/Sheffield Robin Hood airport. As an ex-V-force base, it already has one of the longest concrete strips in Europe.

A frustrated Midlander.

**Greg Herdman**

Clarborough, Retford, UK

air refuelling (AAR) tanker, to allow the airline to fly non-stop between the UK and Australia.

Does he really think that modifying a fleet of civil A330-300s as refuelling boom receivers and training a sufficient pool of pilots to fly them would be a viable exercise?

The boom-equipped A330 MRTT already exists, of course, but this aircraft is more expensive to acquire and operate compared to a standard A330-300, and the task of carrying out safe AAR operations requires extensive crew training, which

currently no purely civil operator has need to train for.

Even the AirTanker A330 Voyagers used by the Royal Air Force, with some pure transport aircraft leased out for civil passenger flights, require fully trained AAR-qualified pilots for tanking tasks – and none of these aircraft have boom refuelling capability.

Another major flaw in his proposal is this: why would Singapore Airlines wish to fly to Australia non-stop using an expensive extra non-revenue earning aircraft when today's

one-stop flights to Australia offer a popular stop-off in Singapore en route? This also provides passengers with a welcome break and an opportunity to boost Singapore's tourism and business income as a side benefit.

No doubt in due course developed models of today's latest widebody jets will allow full UK-Australia flights non-stop, but they won't involve air-to-air refuelling to make the journey!

**Richard Gardner**  
Farnborough, UK

### Mind your (use of) language

I have read your magazine for years. Some time ago you began using what, I'm sure you think, are eye-catching headlines. In my opinion they are nothing more than a failed attempt at being witty.

“USAF could gun for successor to under-fire A10”; “Bell undeterred by Relentless delay”; “Watchkeeper makes time for training”; “Weight is over for Delta as 242t A330 arrives” – this list could go on forever.

Now there's something new: “Americanisms”. “Upgauging”; “Inking a contract” and others. How long will it take you to write nite (night), lite (light) and publish “Flite International”? I'm Portuguese and am aware of the corruption of my language by the Brazilians. Don't let that happen to yours – or should I say “urs”?

In two months time my subscription is due to be renewed...

Aviation is a serious matter. If you insist on what I mentioned above, “include me out” [a famous quote attributed to Samuel Goldwyn].

Now that is what I call witty!

**Ronald Neves**  
Cascais, Portugal

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## EVENTS

### 17-19 July

**Royal International Air Tattoo**  
RAF Fairford, Gloucestershire, UK  
airtattoo.com

### 20-26 July

**AirVenture Oshkosh**  
Oshkosh, Wisconsin, USA  
eaa.org/en/airventure

### 6-7 August

**Baltic Business Aviation Forum**  
Jurmala, Latvia  
bbaf.aero/en/

### 25-30 August

**MAKS**  
Moscow, Russia  
aviasalon.com

### FG 15-16 September

**Flight Safety Symposium**  
London, UK  
flightglobalevents.com/  
flightsafety Symposium2015

### 15-18 September

**DSEI 2015**  
ExCel, London, UK  
dsei.co.uk

### FG 29-30 September

**Aviation Partnership Summit**  
Amsterdam, The Netherlands  
flightglobalevents.com/APS15

### FG 29-30 September

**New Generation of Airline  
Passenger Systems**  
London, UK  
flightglobalevents.com/pss2015

### 1 October

**US Corporate Aviation Summit**  
Fort Lauderdale, Florida  
aeropodium.com/uscas

### 1-2 October

**Central Asian Aviation Symposium**  
Almaty, Kazakhstan  
aeropodium.com/caa

### 6-8 October

**Helitech International**  
ExCel, London, UK  
helitechevents.com

### 20-21 October

**The Commercial UAV Show**  
ExCel, London, UK  
terrapiinn.com/exhibition/  
the-commercial-uav-show

### 8-12 November

**Dubai Airshow**  
Dubai World Central  
dubaiairshow.aero

### 15-17 November

**ALTA Airline Leaders Forum**  
San Juan, Puerto Rico  
alta.aero/airlineleaders/2015

### 17-19 November

**NBAA 2015**  
Las Vegas, USA  
nbaa.org/events/bace/2015

### 17-19 November

**Aerospace & Defense Meetings Torino**  
Torino, Italy  
bciaerospace.com/turin

### 19-20 November

**Safety In African Aviation**  
Kigali, Rwanda  
2gether4safety.org



For a full list of events see  
**flightglobal.com/events**

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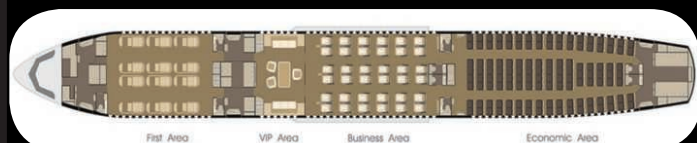
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Engine #2 741809 Cycles remaining 2,294  
Engine #3 741811 Cycles remaining 4,161  
Engine #4 741728 Cycles remaining 3,903

#### APU

Model GTCP331-350C P/N 3800454-6 S/N R-370C



#### CONTACT

**[contact@canogacapitalcorp.com](mailto:contact@canogacapitalcorp.com)**

## Tenders



Ref: DACAW/Delivery Financing/737-800/Senior/2015/253

Date: 16 June 2015

## NOTICE: Request for Proposal (RFP) Senior Loan for Delivery Financing of 2(two) Boeing 737-800 aircraft

Biman Bangladesh Airlines Ltd. (Biman) has entered into an agreement with the Boeing Company ("Boeing") for the purchase of 2 (two) Boeing 737-800 aircraft ("the Aircraft") which are scheduled to be delivered on November 2015 and December 2015. Biman seeks offer from reputed financial institutions for Delivery Financing for the Aircraft in either of the following form:

### (a) Invitation – Senior Commercial Loan ("the Senior Loan") Financing

The financing shall be in US Dollars for a 12 years term for up to USD 89.20 Million. The loan will be supported by a guarantee from the Government of Bangladesh. The form and structure of the loan and the guarantee will be as agreed with Biman and the Government of Bangladesh; or

### (b) Invitation – Ex-Im Bank Guaranteed Loan Financing

Biman has submitted application to the U.S. Export-Import Bank ("Ex-Im Bank") for Guarantee support and Biman expects to receive the Final Commitment from the Ex-Im Bank by middle of July 2015. Basic requirements under this financing are mentioned below:

Purpose of Financing	Term loan to finance the senior portion of the net delivery price of aircraft plus 100% of Ex-Im Bank Exposure Fee.
Estimated Amount of Financing	Aggregate amount of Ex-Im Bank guaranteed financing including the exposure fee will be up to USD 89.20 Million.
Term of Guaranteed Loan	12 years from respective aircraft delivery dates.
Currency of Financing	US Dollars.

2. Offer may be made only for the Senior Loan referred under this RFP, or jointly for the Senior Loan and the Commercial Loan referred under a separate RFP ref: DACAW/Delivery Financing/737-800/ Commercial/2015/254 Date:16 June 2015.

3. Detailed information is available in the RFP Schedule, which may be viewed at Biman's website: [www.biman-airlines.com](http://www.biman-airlines.com). For further information or query, Controller of Accounts, Biman Bangladesh Airlines Ltd, may be contacted at Telephone: +8802-890-1590, Cell: +88-011-9042-0627, e-mail: [controller@bdbiman.com](mailto:controller@bdbiman.com) during the office hours.

4. The Proposal / Offer should be submitted at the latest by 1000 hours BST (0400 hours UTC) on 30 July 2015 addressed to Controller of Accounts, Biman Bangladesh Airlines Ltd., Head Office, Balaka, Dhaka, Bangladesh through Courier Service or E-mail at [finance-737-800-sl@bdbiman.com](mailto:finance-737-800-sl@bdbiman.com). The proposal(s)/offer(s) will be opened on the same day immediately after the closing time. No proposal/offer would be accepted after the closing time on the date specified above. Biman Bangladesh Airlines Ltd. would not be responsible for late receipt of any proposal/offer due to any reason whatsoever.

5. Biman Bangladesh Airlines Ltd. reserves the right to accept or reject any or all proposal(s)/offer(s) partly or wholly at any time and/or stage without assigning any reason whatsoever and no claim shall be entertained in this regard.

Controller of Accounts



Ref: DACAW/Delivery Financing/737-800/Commercial/2015/254

Date: 06 June 2015

## NOTICE: Request for Proposal (RFP) Commercial Loan for Delivery Financing of 2 (two) Boeing 737-800 aircraft

Biman Bangladesh Airlines (Biman) entered into an agreement with The Boeing Company ("Boeing") for the purchase of 2 (two) 737-800 aircraft ("the Aircraft") which are scheduled to be delivered in November 2015 and December 2015. Biman has already made the advance payments (i.e. Pre-Delivery Payment) required under the Boeing Purchase Agreement for the Aircraft. Delivery financing for Senior Loan of the Aircraft net price, on which first charge will be created, will be arranged as provided under the separate RFP (Ref: DACAW/Delivery Financing/737-800/Senior/2015/253 Date: 16 June 2015) titled as "Request for Proposal (RFP) Senior Loan for Delivery Financing of 2(two) Boeing 737-800 aircraft". The remaining amount of the net aircraft price will be financed either in the form of a subordinated loan with a second charge or purely commercial loan. Such a loan will be supported by a guarantee to be provided by the Government of Bangladesh.

2.Offer may be made only for the commercial loan referred under this RFP, or jointly for the commercial loan and the senior loan referred under a separate RFP: DACAW/Delivery Financing/737-800/Senior/2015/253 Date: 16 June 2015 titled as "Request for Proposal (RFP) Senior Loan for Delivery Financing of 2(two) Boeing 737-800 aircraft".

### 3. Basic requirements are mentioned below:

Purpose of Financing	Term loan to finance part of the net aircraft delivery price.
Estimated Amount of Financing	Aggregate amount of financing will be a maximum of USD 20.45 Million.
Term of Guaranteed Loan	Up to 12 years from respective aircraft delivery dates.
Currency of Financing	US Dollars

4.Detailed information is available in the RFP Schedule, which may be viewed at Biman's website: [www.biman-airlines.com](http://www.biman-airlines.com). For further information or query, Controller of Accounts, Biman Bangladesh Airlines Ltd, may be contacted at Telephone: +8802-890-1590, Cell: +88-011-9042-0627, e-mail: [controller@bdbiman.com](mailto:controller@bdbiman.com) during the office hours.

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WORK EXPERIENCE BRITTNEY MICULKA

# In training for simulator success

Aerospace veteran Brittney Miculka promotes comprehensive aviation education solutions in her new role at Redbird Flight Simulations, where she heads up the ImagineFlight initiative – a flight school trade organisation

## Where are you from and where are you based now?

I grew up in the Chicago suburbs and went to college at the University of Illinois Institute of Aviation and studied Aviation Human Factors, while also training for my commercial pilot and flight instructor certificates. I spent seven years in Frederick, Maryland, until my recent relocation to Austin, Texas.

## What was your first aviation job?

I was a flight instructor at the University of Illinois, teaching students in the professional pilot programme. After three years of instructing part- and full-time, I decided that the airline pilot career track wasn't for me and that I didn't need to keep building flight time, so I moved from Illinois to Maryland to work for the Aircraft Owners and Pilots Association (AOPA). In 2007, I started my career in the AOPA Pilot Information Center, where I spoke to pilots on the phone all day and had to be ready to answer any type of technical aviation question, from regulation clarifications and training guidance to aircraft valuations. Then security issues became more prevalent in general aviation in the USA, with increased TFRs [temporary flight restrictions]; CBP [Customs and Border Protection] electronic Advance Passenger Information System (eAPIS) requirements; and the proposal for the TSA [Transportation Security Administration] Large Aircraft Security Program, and so I transitioned to the role of manager of security



Miculka was a flight instructor at the University of Illinois for three years

for AOPA government affairs. My passion has always been flight training and promoting general aviation, and in 2011 I took the opportunity to work in flight-training student retention and growing and strengthening the pilot population with AOPA, as the director of pilot community development. Just recently, I was given the opportunity to move to Austin and lead, as director, a new initiative with Redbird Flight Simulations called ImagineFlight. With the 1,500 mile [2,400km] move to Austin still so recent, there are many things to learn, to plan, and to do. Unfortunately, it's kept me away from my own personal flying.

But that is the great thing about flight simulators: no matter the actual time of day or weather outside, I can keep my currency and flying confidence up by hopping in a Redbird!

## What is ImagineFlight?

ImagineFlight is a new initiative. ImagineFlight will serve as a flight school trade organisation that promotes and provides quality flight-training experiences. Flight schools are the backbone of the aviation industry and I am looking forward to helping those schools thrive.

## What is Redbird's mission?

Redbird's mission is to use our passion for aviation to deliver a truly revolutionary training

device. Our products are at the leading edge and we work to deliver fully capable and comprehensive flight training devices, backed by the best service and support at a cost every flight school can afford. Redbird Flight is constantly striving to move general aviation forward in the best way possible – through its simulators, its Skyport flight training laboratory and with the RedHawk flight training aircraft. Redbird is now paving the way with training aircraft remanufacturing. Redbird began development on the RedHawk project in 2012 with a goal of creating a standardised training aircraft that is affordable, operationally economical and technologically advanced. The result is a remanufactured Cessna 172, equipped with a Jet-A-burning, FADEC-equipped Continental engine.

## What's the best part of your job?

Being with an innovative company and working with people who are as passionate and positive about the future of general aviation as I am. I also enjoy working at aviation events and trade shows where I get to talk with our customers and fellow aviators. ■



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